Ontario

No. N-15

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy

Electricity Demand and Supply

First Session, 34th Parliament

Thursday, September 15, 1988

Speaker: Honourable Hugh A. Edighoffer
Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the back together with a list of the members of the committee and other members and witnesses taking part.

Reference to a cumulative index of previous issues can be obtained by calling the Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Service, Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toronto, M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Thursday, September 15, 1988

The committee met at 10:14 a.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY
(continued)

Mr. Chairman: Would the members all sit down? I will not ask you to take your seats because we would like them left in the room.

Our first witness today is Enserve Financial Corp. Stephen Probyn is the president. I wonder if you would introduce the other member of your panel for the benefit of Hansard, perhaps just tell us a little bit about yourself and then I will turn the floor over to you for your presentation.

ENSERVE FINANCIAL CORP.
BECHTEL CANADA LTD.

Mr. Probyn: Thank you very much, Mr. Chairman. My name is Stephen Probyn. I am the president of Enserve Financial Corp. We are a small–I hesitate to use the word but it is often used–boutique financial firm which is involved in the project finance area almost exclusively. We work with a number of large clients.

I would like to introduce you to Herb Harmer, the senior vice-president of Bechtel Group Inc. responsible for marketing in Canada, who has come with me today.

Mr. Harmer and I both have presentations. I thought perhaps the best way to conduct this would be for Herb to begin with a short statement on Bechtel's view of the world. For those of you who are not familiar with Bechtel–Herb can speak for himself–Bechtel is one of the world's largest engineering firms. It is probably the leading constructor of power plants in the world. The installed capacity of the United States is 500,000 megawatts; Bechtel has constructed 250,000 megawatts. It gives you some idea of the company's background. They have been involved in Churchill Falls, James Bay and Limestone.

What is not well known about the company is its role in cogeneration in the United States, where it has played a leading role in both industrial and municipal cogeneration. I think Mr. Harmer is well able to speak to some of the business issues that face this field in Canada.

Mr. Harmer: If I may, I will just put on one slide here. With Mr. Probyn's introduction, he may well be the new manager of marketing for Bechtel in Canada, so I will not go into any of my company's background but go straight to the point.

In reviewing the growth rate of power demand in Ontario, I think by any measure you have to regard it as a very critical issue. As we see it, sources of new energy to Ontario are limited on a practical basis to gas, coal, nuclear and direct imports or the possibility of Ontario Hydro taking equity positions in other developments outside the province to ensure the energy supply from outside.

Just looking at that slide for a moment, Ontario with a 30,000-megawatt system growing at a rate of four per cent per annum requires, by simple arithmetic, 1,200 megawatts of new power per year. That is really an enormous demand, and as the system becomes bigger, the demand becomes bigger. I might say that Hydro-Québec has a very similar situation.

Looking at the options, gas is currently an excellent option. It is being considered throughout the eastern United States; it is of course being considered here in Canada. Gas has one aspect to it. It is such an excellent domestic fuel source that its long-term use for power generation could be in question. As power plants go on to gas, the so-called gas bubble, I think, is in danger.

I would draw your attention to the domestic use of gas and would suggest that even if gas were four times its current price, it would still be an excellent domestic fuel. I do not think anyone would stop using gas if it were four times as high. However, it would be too expensive for power generation.

While gas is excellent over the short term and provides a quick fix, I do not think it is a good long-term option. I think the people in the gas industry would generally agree with that. Although they want to sell a lot of gas right now–they are doing it–it is just too good for domestic use and there is no substitute for domestic use.

Mr. Passmore: Just one quick point of clarification. Are you talking strictly about straight electric generation from gas? You are not talking about gas cogeneration?

Mr. Harmer: Gas cogeneration falls into the same category because it still uses enormous quantities of gas. Gas cogeneration is a good

option, but again, when you are committing these enormous supplies to the production of electric power, ultimately that is going to affect the amount available for domestic consumption. It is definitely going to affect the pricing. That may be five years off, but five years is the time frame for building a new power plant.

Mr. Passmore: I will let you finish your presentation and then I can come back to that.

1020

Mr. Harmer: Looking at coal as an option, there is a perception that the CO^2 produced and the greenhouse effect will be increasingly difficult to overcome, and it is conceivable that coal plants in the future may be even more difficult to site than nuclear plants.

The greenhouse effect has been the subject of a lot of discussion in Ontario this year because of the weather. Many people feel that it is a fact; it certainly is a perception, and the burning of coal is associated with that perception. In building a coal plant, of course, it needs to be pollution-free and you can scrub fumes. This is all quite technically possible, but it is expensive.

The nuclear option involves the use of proven Candu technology, and Ontario Hydro has obviously been heavily involved in this for years. It is clean, the risks are known, we have the fuel and we have the means to reprocess spent fuel. Studies on slightly enriched uranium for Candu plants make the use of this fuel even more efficient.

Looking at imported energy, when you look at importer equity participation in projects, this could be a good option outside the province. One thing it does is provide some incentives to go ahead with integrated grid systems with the utilities on either side of Ontario, i.e., Manitoba and Quebec. The aspect, therefore, of importing power and the cost could be somewhat mitigated by the overall efficiencies of a larger system.

Coming back to new generation in Ontario, the investments are very large. At the present time and under the present structure, these investments go against provincial debt. I feel, therefore, it is opportune to consider alternative private generation in Ontario for at least a portion of the new growth. With a guaranteed rate, private sector capital could be used for generation and for introduction directly into the Ontario grid. Ontario Hydro would remain responsible for distribution, and the builders and generators would be subject to the same licensing procedures as Ontario Hydro.

Taking this mode, it would have the added benefit of encouraging the engineering construction sector in Ontario and provide that sector o engineering services within Ontario with th same market that the Montreal engineering firm have enjoyed from Hydro-Québec. Such capability in Ontario would give the engineerin construction sector an important base from whicl to export power projects outside of Ontario an outside of the country.

Ontario, through its present experience in th nuclear field, should be the centre of leadershi in Canada for the provision of services for Cand power plants. While Ontario Hydro builds thes plants, the engineering construction market i denied the private sector. On the operations side Ontario Hydro is among the world leaders i utility operation, and this is a service that shoul find worldwide acceptance, but I note th operations side. A policy of encouraging privat sector power generation would go toward building private sector expertise and reduce th pressure on Ontario Hydro for similar services i the future.

In summary, as a recommendation for th committee, I would suggest that a committe recommendation would be to take, for example 50 per cent of new generation and establish policy that this be provided through the privat sector. I think this would be a challenge t industry, it would take some of the pressure o Ontario Hydro, and I think it would be beneficial policy for the province.

Mr. Probyn: My presentation is in the natur of a backgrounder, and I wanted to move throug what I consider some of the key economic issue we face.

First of all, when I read through the Ontari Hydro demand growth, I was impressed by number of things. I was impressed by the commitment to reducing their load growth. The speak a great deal about how they are going t undertake a number of demand managemer measures and ameliorate the current situatior My own feeling is that it is problematical, to us the most polite expression I can use about it.

The reason it is problematical is reall twofold; it is institutional and it is economic. Th first, the institutional reason is quite obviousl that Ontario Hydro is in the business c producing electric power. They have a very larg establishment. In fact, they are one of the be utilities in the world. Our utilities are second t none, and Hydro is really the best in Canad: They have a very strong institutional imperati towards power production, and they have sul stantial access to capital. The rating of Ontar Hydro is now triple-A–it has been upgraded wi

: province's–and Ontario Hydro really has :cess to as much capital as it requires for pansion.

In the United States, we did see utilities get o demand management to a great degree. That ıs partly as a result of pressure from the gulatory authorities, the public utilities com- ssions, but to my mind more specifically cause of capital scarcity. Utilities in the United ates, largely as a result of their nuclear ɔgrams, found themselves under enormous essure. Their ratings were dropped below vestment grade in some cases, and therefore ey really had to make do with demand anagement. But the attitude of utility execu- es to demand management is always exactly at: they are making do because they are in the siness of power.

The other real reason I see this particular enario as being very optimistic is that, based on y experience in the oil and gas sector, rticularly the international oil sector, I see a ntinuation of relatively low energy prices. gain, because all energy prices do fluctuate in lationship to each other, that implies to my ind that we are going to have a continuation in onomic growth and also a continuation of latively cheap energy. As we saw in the early 980s in this country and also in the United ates, the single most effective way to reduce iergy consumption is to increase its price. It ands to reason. So I personally look much more wards their high-growth scenario, and that is iite substantial. You have almost a third more the out years of peak consumption.

Looking at the sort of magnifying glass that I ive drawn around the year 2005, that could present as much as $20 billion to $30 billion of :w investment in hydroelectric capacity–I iould say electric power capacity–in this ovince. We tend to talk about hydro; of course, e do not actually have very much of it left. We e talking about a very substantial new invest- ent in electric power, and of course there are a ımber of questions.

To my mind, there is kind of a paradox, what I ıll the paradox of power. Basically, Ontario eds, at a minimum, $5 billion to $16 billion ɔove and beyond its projections. This is public ctor investment under the current scenario, and e have another situation which adds to the oblem; that is, economic growth will force ven more infrastructure demands on the public ctor. As we stimulate growth in the province, e find that not only do we need more electric ɔwer capacity, which is enormously capital-intensive but also the public sector will face demands for hospitals, schools, roads–all the paraphernalia of an advanced infrastructure.

1030

I would like to refer briefly to where we are going to find this new energy. In my view, again looking at the supply alternatives, we find that the lead times are critical. If we do not see another nuclear station being commissioned within this electoral cycle, which I feel is quite probable, given the politics of power, then we will not be able to bring on new nuclear capacity until beyond the year 2005. The lead times are that great.

In terms of coal-fired capacity, as Mr. Harmer has pointed out, we have some major problems. With regard to new coal capacity, again, the lead times are now a decade; so it is very difficult even to see it within that 1990 to 2000 scenario. Then there are increasing questions about the technology which emits several conventional pollutants, NO_x and SO_x, which are also contributors to the greenhouse effect. That leaves us in the near term, in my view, with natural gas. However, on the natural gas side of things, we should realize that the market is beginning to firm. We have had about a decade now of the so-called natural gas bubble. People are no longer looking for natural gas, and supplies are beginning to become tighter. There is an article in this morning's Financial Post, for example, that indicates that the United States supply is tightening which, given the export orientation of our industry, is a sure sign that the same is likely to become apparent here.

When we look at the structure of power in this province, and really this is what I want to focus most on this morning, the structure of power today is one monolithic power corporation with a number of municipal utilities. There is a good reason for that, but the good reason is largely historical.

Ontario Hydro grew out of an amalgamation of smaller utilities into a large public crown corporation over the years, and these utilities were all vertically integrated. They generally had a little hydro station sort of out back and they would transmit the power along to the customers. They performed the generation, transmission and retail sales functions of the industry. The great achievement that public power in this province has made is that it has increased the efficiency enormously. The small utilities were replaced over time with the larger system and the reliability of the grid that Ontario Hydro was able to develop. Nevertheless, the fact that we have,

through history, got this should not blind us to the fact that we have three different sectors within that one monolithic corporation, and they all have very different economic characteristics and can be looked at in that light.

Just starting with the retail sector first, although it is the end of the chain, we find that we have a distribution function. Of the major sectors involved in power, it is the lowest in terms of its capital intensity. Generally, it is a local monopoly, and hence, we have a lot of local utilities. There is a strong need for integration of the power supply into other infrastructure planning processes. If you are building a new subdivision, you have to deliver the power to that subdivision. The transmission has to be accommodated with other infrastructure aspects; so you want to have a high degree of municipal involvement at that local level. That is very important to ensure the smooth functioning of power distribution.

Then when you move to the wholesale level, you find, again, a different characteristic. You find an Ontario grid–in fact, of course, our grid is our northeast grid–and there the economies of scale are very important. You have to have a large grid to ensure system reliability so that if one plant goes down, you are not affecting the entire system, which is why Hydro has the reserve policy it does. You also have imports and exports from that system and they have to be managed in an integrated way.

It is the classic case, usually used as such in economics classes, of a natural monopoly. There is only one set of lines that is going to be thrown up around this province and it should belong to Ontario Hydro. I believe Ontario Hydro's greatest achievement in its development has been that grid, and it has worked very well as a public sector institution. In fact, in the United States, the development of similar grids has often been done through the public sector, particularly in the west where, for example, the Bonneville Power Administration manages the grid in the northeast, and various others, such as the Western Area Power Administration, are public sector organizations because it is a natural monopoly.

You then turn to the generation side, the production side. There, in contrast to a natural monopoly, we have what I call natural competition. We have various technologies, as we have seen, and various energy sources. What we are producing is a commodity which is electricity. The commodity has certain characteristics. Unlike, say, crude oil, you cannot transport it more than several hundred miles. It needs wires to be transported. It is essentially a commodity and in the US it has been increasingly treated in th light.

If you look at it in that light, you can reduce t chances of hidden subsidies. Everybody has theory on what the best energy source is. Son people think it is natural gas. Some people thi it is nuclear. Others may even think it is oil-fired plant, and people obviously did becau there are a great many of them around. The re benchmark, to my mind, has to be the compe tive price that that commodity comes out because it is producing exactly the same produ electrons flowing through a wire.

If we expose the sector to competition, th what we can produce is a least-cost alternativ We do not have people putting up plants th happen to have something they like, may located somewhere they like. I was told last nig that Atikokan thermal station produces power 17 cents a kilowatt-hour. You will not know th and you do not see it because it is such a sm part of the cost of electricity you pay. Unle there is a competitive dynamic in that producti sector, you will never know whether ne individual sources are economically priced not.

Where I come down at the end of the day is look at a tiered industry structure. I think what have to do is say we are not going to break th company up horizontally. What we should looking at is dividing the tiers so that the natu characteristics of each tier are most predomina and we have a retail distribution end.

1040

What is the characteristic of that? T municipal utilities are staffed by boards appoi ed by the municipalities, for better or worse. W have all had our problems with individu utilities. There is a degree of local involvement power planning in Ontario that is not the case other provinces, where they do not have that ki of municipal structure. Also, of course, Onta Hydro has a very strong role at that local lev and, quite obviously, it will continue to be in t distribution business in power.

Transmission is an Ontario Hydro functio and I would say that is where this utility shou concentrate its efforts. It should be primarily the business of maintaining that grid.

That brings me to generation. When you ha a person who is operating the grid, who has institutional dynamic towards keeping cont over the system as a whole and that person is t same person who is the monopoly utility in th province, it is going to be very difficult to ha anything more than what, frankly, is lipservi

aid towards private sector generation. I think if ie Legislature and the government are serious bout the reform of electricity and if the whole ry about controlling Ontario Hydro is anything iore than something we have all heard for about 0 years, then it is about the reform of the ructure.

I think what we should do there–and I am not dvocating something that throws out the experince and the positive benefits of our system ecause as I say, it is a very effective system–is plit off Ontario Hydro's generation into, ceriinly in an initial instance, a subsidiary so that /e can see what its generation is doing and what s grid management is doing. That, to my mind, irst of all, is the most important thing you could o. Second, I think it is the only way in which ou will seriously change the nature of power in iis province.

I would see the generation sector as having two omponents. One is Ontario Hydro maintaining s existing generation, and the other one is rivate sector which, as Mr. Harmer said, will be rought on through indicative targets. You /ould say, "Well, half of new generation is oing to be private sector."

Another thing I should mention is that locked ı that generation subsidiary of Ontario Hydro is n enormous asset base. It is like a provincial ank account and it is worth, depending on your iews on private nuclear, between $5 billion and 15 billion. Certainly, in the conventional ector, there is an institutional appetite. The ıvesting institutions, pension funds and insurnce companies, have an appetite to buy those ssets. As I say, Ontario Hydro might continue to perate them, but they will purchase them and hose funds can be liquidated for use in dealing vith the province's other infrastructure needs–he highways, the other transportation systems hat the province will have to invest in because, et's face it, we are one of the fastest-growing conomies in the world.

In terms of regulation, I think regulation hould be largely consistent with the nature and tructure of the industry in the distribution. You ıave the municipal appointments to the utilities, he control they exercise through control, for nstance, of Toronto Hydro. You have the Ontario Energy Board, which also regulates listribution, bearing in mind that these are local, ıatural monopolies and must be regulated.

In the transmission area, I see an expanded ole for the OEB, because if you have an rganization which has a subsidiary, on the one ıand, in the generation business and the private sectors, on the other hand, then there has to be some way of determining who gets access to the grid and what is in the public interest, which is the job of a regulatory body. The OEB in that case would set policy for access to the grid and it would also approve contracts. It would have a role. The one thing I would point out is that in the small area, let's say under five megawatts, one would have either an expedited regulatory process or a simple policy of Hydro in terms of buying small hydro.

Actually, Mr. Passmore and I talked quite a lot about the issue of regulation. My initial reaction was that regulation is anathema and I did not want to see any of it, but the more I think about it, the more I feel that in this case it is a natural monopoly and natural monopolies are regulated in our system of government. I do not see generation being regulated by the OEB per se because it is a competitive industry.

With transmission, because the access is being set on the public interest, the regulation would, in effect, occur there. Obviously, there is a large body of environmental and planning regulation in this province and they are complying with that; there is no talk about exempting them. But I think in terms of economic regulation, you do not say: "We're going to set a rate of return for you, Mr. Private Sector Generator. We're going to control access. We're going to say it is in the public interest for you to be supplying electricity into our grid at X cents. If you are a wizard and you can make 100 per cent return and still supply it at a price that is consistent with the public interest, that's fine."

What you are doing is promoting efficiency. When you get into rate base regulation, there is invariably a loss of efficiency because by putting into the rate base costs, you can get a return on them.

There are a number of issues, and I will finish up quite quickly. First, what are the implications of what I am saying in an economic sense? In my view, there will be greatly reduced demands on the public sector, especially in terms of the capital markets. One of the problems we have had over the past few years is crowding of capital markets by public sector institutions. Many economists will tell you that is one of the reasons interest rates have remained high. I think it is important to try to restrict the government's dependency on capital markets. It is also debt we all have on our shoulders. The indebtedness of the province is a liability of every one of its citizens.

I believe the private sector can make a rapid response to what I think is the impending crisis in supply. I think you have an article I wrote for the Financial Post on that. I did not want to talk about it, because I wanted to focus on the structural question, but I believe we have had a situation in Ontario where the official figure of planning energy growth by Hydro has been a 2.5 per cent basis. I see it is now down to 2.1 per cent. We have not had a two per cent or 2.5 per cent year since 1982 and we are saying we have had six years of above trend.

1050

When does above trend become trend? That, to my mind, is the fundamental question. It relates, again, to this whole question of demand management, which I believe is exaggerated. The private sector will bear risk. Obviously, the contract structures will put some of the risk on Hydro, but a lot of the risk will be borne by the private sector, particularly in the area of costs, cost overruns and noncompletion. Typically, the private sector will bear 100 per cent of these risks which are now borne by the taxpayer. As I said, there is a much more competitive energy pricing in the generation sector, which is the critical sector in terms of capital intensity.

Finally, as I said, first there is a releasing, in a sense, of the province's credit capacity to meet other needs and there is also this bank account of Hydro assets that could be sold to the private sector with no effect on power rates in Ontario for the simple reason that they are already earning a return in the public sector.

There are a few policy considerations. First of all, there would be a reaction from Hydro. It does not want to be a common carrier. I am not suggesting, per se, that it is a common carrier in the same way that, say, TransCanada PipeLines is a common carrier, but I think that philosophy is the appropriate one in looking at the grid. I believe what we should be doing is looking at how a grid could be managed in a regulatory sense in the public interest.

The sale of existing assets I have already mentioned. Environmental controls: One of the questions that invariably comes up is, if you are going to let the private sector do it, what happens to all the environmental controls we have already got? My answer, based on 15 years as an energy policy adviser in three countries and two jurisdictions, is "Balderdash." I have always found that the worst polluters in an industry tend to be the public sector companies.

There is a reason for that. I am exaggerating a little bit for effect, but the reason is that the public sector companies are not regulated. There is nobody sitting on them saying "You can't do that." They build an enormous constituency within the government and a great power base and can, in fact, mobilize their resources better than, let's say, the policy ministries or the other ministries that are charged with controlling them.

It is not just in environment. As an aside, I can remember that the worst people for the independent gas station owner to deal with were always Petro-Canada people. The reason was that they did not have to worry; the government was not going to go after Petro-Canada because Petro-Canada was the government. I think there is an institutional factor that works into that. Environmental regulation in this province is extensive and it is done through a regulatory process that is open to public accountability. I believe private sector generation will increase that public accountability of the environmental regulation in Ontario, not reduce it.

Cost of funds: I had discussions with a number of institutional corporate finance people in various leading investment banks before coming here, just to get a sense of that issue. It is certainly one I have had a handle on for quite some time in my day-to-day work. They do not see a significant increase in the cost of funds because of the high degree of the credit. The credit structure that will be used will provide for a cost of funds that is very low, because you have a market that is guaranteed and technology that is well known and built under fixed-price contracts. If you can line up your energy supply, a private sector company can have a cost of funds similar to that of the public sector. In cogeneration, where there is a high degree of tax drive available, the cost of funds can be lower than the equivalent in the public sector.

The final thing is, we cannot use Ontario Hydro for public policy purposes. In fact, again in looking at the Financial Post, there is an article this morning about the Deputy Minister of Industry, Trade and Technology, who testified here yesterday. Unfortunately, I was not present for his presentation, but I do not believe that Ontario Hydro should be used as a policy vehicle. If you say, "Okay, you're going to buy from a certain sector. Boy, that's really going to help that sector, because you are a huge purchaser of power," when you come to them for accountability and say, "How come your power rates are so high?" they will say, "It's because we are restricted in our purchasing policy."

As soon as you start to try to use Hydro as a policy instrument, you lose any ability to control

ts bottom line. So my strong belief is that if the government wants to use the power sector as an instrument for public policy, then it should do it through legislation or regulation. If there is some sort of buy-Canadian policy, which of course is not possible now because of the free trade agreement, but if it wants to do that, then the government should issue regulations. You can regulate, of course, through your regulation of access to the grid. You say, "If you haven't complied with these standards of policy, then you can't get on to our grid," and you can use the Ontario Energy Board or whatever regulatory instrument to fulfil that function.

My feeling is, if you want to use power as an instrument of public policy you do it explicitly so that you can count the cost, but do not do it by a sort of "nudge-nudge, wink-wink" approach, because what you will find is you will not be able to control the end result.

These are the recommendations I would make. I believe, first of all–and these are not in chronological order; they are just numerical–it is vital to restructure Hydro into an operating company and into a generation asset subsidiary to split out and make explicit that division.

Second, in that context, I think the OEB has to be redefined in terms of its regulatory role.

Third, I support the panel's recommendation–and I gather that the Minister of Energy (Mr. Wong) has announced a policy in line with this–to review current true nuclear costs so that we can correctly establish a benchmark, and again I agree with Hydro that nuclear will be the benchmark.

Fourth, I believe, along the lines of Mr. Harmer, that we should implement an expanded public purchase policy and I agree with his suggestion that it should be a 50 per cent target. A specific target, again, will produce a yardstick and you have to have yardsticks in something as formless as energy policy.

Finally, I feel that consideration should be given to the divestment of part of the existing power generation asset base. This is not an essential part of reforming the hydro generation in this province, but I feel that from the government's perspective, the money that is locked into conventional hydro assets could probably be better used locked into roads, expansion of the Gardiner Expressway, new public transit systems or whatever we need to accommodate the massive growth that I think our province is going to undertake.

1100

Mr. Chairman: Thank you, Mr. Probyn. Before we go to the general questioning, I wonder if I could clarify something on the capital required here. I sense we may need something upwards of $6 billion to $10 billion or maybe even $15 billion to fund the private generation you are talking about. You mentioned the pension fund might have an appetite to buy existing projects, which I can understand, because they are proven.

They could not, of course, easily get into these new projects. They would be unproven, nonqualified–in the jargon, basket investments for the pension funds. There is a seven per cent basket the funds have. We have only something like $300 billion in pension funds in Canada. That means we have only about $20 billion in basket investment funds already committed. The growth of pension funds is around $20 billion a year. This means that every year you are adding only about $2 billion to the basket. If they scatter this around Canada, we may find we have only $1 billion per year new in Ontario and they would like to do other things than just invest in these things in their baskets.

I am just wondering where the money would come from. It appears it may not come from these pension funds. Our banks tend to be a little risk-averse. We are not so great at venture capital up here. We not not tend to buy into the equity markets. Are we talking offshore money?

Mr. Probyn: There are two answers to that. First, with regard to basket investments, what you are saying applies primarily to the small entrepreneurial companies, of which I am all in favour, but does not apply to larger cogenerators, such as TransCanada, which can raise funds both through equity issues and debt, both of which are absorbed by the pension fund. I think only part of the sector will be outside the basket provisions of the pension funds.

Second, the insurance industry is not quite as restricted in terms of basket investments as the pension funds. The insurance industry is very interested in cogeneration. Together with Bechtel and another firm, I am involved in a proposal to build a cogeneration plant, initially 60 megawatts going up to about 160, for the railway lands area downtown. I developed an institutional financing structure which utilized some of the tax benefits which are involved in that particular section. Then I went around and peddled it to the insurance companies because I wanted to line up our financing prior to making the proposal. Do you know how many insurance companies I had to approach? I needed four for this structure.

Mr. Chairman: You probably approached only one.

Mr. Probyn: Four. My point is that there is a lot of interest. Finally, there is a lot of offshore–

Mr. Chairman: If I can just stop you there, you approached them. The insurance companies have to live under the same rules as the pension funds. I am just wondering how much money you were raising.

Mr. Probyn: In that case, $70 million.

Mr. Chairman: They might jump at it because the return is good, but I am wondering if, on a scale of $10 billion, there is going to be enough.

Mr. Probyn: I think so.

Mr. Chairman: In Canada? Or does this have to come from outside the country?

Mr. Probyn: I do not have at my fingertips the size of the insurance industry as a whole. Sun Life Assurance Co. has assets of $40 billion.

Mr. Chairman: The insurance companies may represent another $300 billion in Canada, so you double the figures I just talked about. Is there still going to be enough, when there are all kinds of other high-risk or new types of investments for them? It just seems to me the money may have to come from offshore.

Mr. Probyn: Then the third element is the international capital market. To the extent that one is marketing debt, one can raise funds globally in Canadian dollars without any problem.

Mr. Chairman: Because of the guaranteed rate.

Mr. Probyn: Especially of their debt, yes. Because of the security given by essentially being integrated with one of the truly great electric power utilities in the world, which is Ontario Hydro. I do not see a capital availability problem and, in fact, to the extent that there is one in the private sector, there would also be one in the public sector.

Mr. Chairman: But Hydro can raise as much as it wants and it is all qualified because the debt of the government is qualified.

Mr. Probyn: Hydro also raises a great deal overseas and it raises from nonqualified institutions that are outside the pension area. The liquidity of the Canadian capital market is very substantial. Everybody I have discussed this with shares my view that that is not a serious problem.

Mr. Chairman: Thank you. Perhaps you would like to take your seat and we will get on with the general questioning. I guess I have stolen enough committee time.

Mrs. Sullivan: I want to direct some questions to Mr. Harmer. I am interested in your recommendation that the committee make a recommendation to establish 50 per cent of the new generation through the private sector.

As a preliminary, there are two aspects I would like to raise. One of them is the fact that in the short term, private power generation tends to be used to replace existing Ontario Hydro generation; it provides Hydro with an opportunity to reclaim, refit, do maintenance or whatever on a plant or to enhance its capacity for peak periods or whatever. In the short term, it really is a replacement of the existing generation capability.

In the longer term, private generation is most likely to meet your requirement of addressing new demand needs. I think the figure we have been looking at about economic potential for private, independent generation is about 1,100 to 1,600 megawatts by the year 2000, of which about 700 to 1,000 megawatts are cogeneration.

Correct me if I am wrong, but I suspect that the cogeneration is probably going to be located in the larger firms. It will be the big pulp and paper companies, the big chemical companies and the big automobile manufacturers that are really going to be pursuing cogeneration. The private generation going on to the lines is probably going to be different.

You are suggesting 50 per cent of targeted new capacity. I wonder if you could just expand further, first, on what can be done to encourage that growth in the private sector, particularly cogeneration–I am interested in that right now–and second, on what the barriers are to achieving that. It is the first time that anybody so far has said that 50 per cent ought to come from outside the system. I am really quite interested in your views.

Mr. Harmer: First, I refer to one item. You mentioned 1,100 to 1,600 megawatts by 2000. The very simple arithmetic I use on this is that we have a 30,000-megawatt system and we are growing at, say, four per cent a year. That number has been exceeded every year for the last six years, I think, as Steve has pointed out. I look at it as a requirement for 1,000 to 1,200 megawatts a year going from, say, 1995 to the end of the century. So, first of all, my number would be somewhere around 5,000 to 6,000 megawatts.

Second, cogeneration is a very attractive option at this point in time. It is efficient. It is

ean. There are long-term gas contracts avail-ble. Whether those long-term gas contracts will available three or four years from now is a uestion, because as more and more gas is used r generation of electric power, as I said, a arket situation will occur and the price could hange. Cogeneration could be used by private ompanies that wish to develop, say, their own -house power sources.

Looking at barriers to cogeneration, I am not miliar with any real barriers at this point in me. As Steve has mentioned, we looked at the istrict heating plant here in the city. We got a 5-year gas contract at a fixed price. It escalated, course, but we got the gas contract. We have e institutional investors and we were looking at oing through the various parts of the system to et our contracts tied up. One thing about ogeneration and natural gas generation is that ese plants are environmentally more benign an others. There are no big field storage depots. ou just bring it in a pipe. Therefore, they can be laced closer to the demand than power plants at you have to build in northern Ontario and so n.

110

You mentioned the short term, but if I can, let e just direct your thoughts to a much-longer-rm situation here. The interest that I have in rivate sector power generation really relates to e future of nuclear plants, because I feel that uclear plants represent the cleanest and best ng-term approach, certainly for North Ameri-a. There is a bit of a mindset right now that says ou take a nuclear power plant and, after 40 or 50 ears, Ontario Hydro will have to put up money nd have allowances for decommissioning these ites, taking them away and putting grass on em. I submit that is just such incredible folly as be unbelievable.

Instead of looking at decommissioning nuclear lants and taking them away, we should have a x system which allows us to take advantage of uilding plants for 200 or 300 years. The fact of e matter is that as long as we use electricity, we re going to be producing from those plant sites. he transmission lines are in. The infrastructure built around it. You are not going to be able to ite new plants. You are going to have an awful me finding new plant sites.

I think, therefore, we should get into an nlightened type of thinking that says: "Those ings are going to be around for 200 or 300 ears, and when the generators wear out, we are oing to put in new ones. When the reactors wear ut, we want to design these plants so that we can put in new ones, but we are going to use that site." That is the kind of thing we need to be thinking, because that infrastructure is going to be with us well into the next century. Instead of short-term, I just think that it is well to think of the much longer term.

Interestingly enough, one of problems is you cannot put money into a project that you cannot amortize, say, over 40 or 50 years. The accounting rules do not do it. We need some kind of allowance or some kind of depreciation which gives a company a financial advantage to building a facility that is going to be around for a long, long time. In our own company, we have discussed this at great length. Electric power is increasing in usage as a percentage of total power. It is increasing every year.

There is a lot of nitty-gritty that we have to think about right now and a lot of short-term demands, but the long-term of it is, if we are really thinking out front and planning for the next century, we have to look way beyond what we are looking at now. It is just inconceivable to me that you would take the infrastructure of these sites that we have at the present time, destroy it, take the transmission lines out and graze cows on it again, because it just does not make sense.

The enlightened view says we are going to keep using that site. The geology is known. We are satisfied that the proper investigations have been made. We know that it is on a good source of cooling water. We know that we do not have to go back and get new transmission lines through urban areas and that type of thing. Those transmission lines are in place. We might be able to improve on the appearance of them after 40 or 50 years, but they are there. I think this is a good policy to adopt, an enlightened policy, and it is not one that is very prevalent in the industry at the moment.

I am sorry. That is a very long-winded answer to your question.

Mr. Chairman: I would like to wrap up this session about 11:30, which is in about 15 minutes. I have Mrs. Grier, Mr. Dietsch and Mr. Harris on the list, so perhaps we could govern ourselves accordingly.

Mrs. Grier: I have three subjects I would like to touch on and the first one is just to be clear on what Mr. Probyn was saying, as opposed to Mr. Harmer. As I understood Mr. Harmer, he was saying to set a target of 50 per cent of private generation for future new generation.

Mr. Harmer: Correct.

Mrs. Grier: Do I take it, Mr. Probyn, that you were implying that we ought to be privatizing

existing assets, and did you set a 50 per cent target for that?

Mr. Probyn: On existing assets, no. I am really saying, in a sense, two things. I subscribe to the idea of half the new generation being conducted in the private sector. I am also saying there is significant opportunity to privatize existing assets. I think, in that case, it is done on a case-by-case basis; I would not set a particular target.

Mrs. Grier: I see enormous advantages in encouraging cogeneration at this point for new generation or private investment in generation. My concern, though, is that, for example, you mentioned the railway lands project where you have a 15-year agreement with Toronto Hydro or whoever. At the end of those first-phase agreements, which would be a period when we would be more dependent on that private source than we are now, how do we avoid being held to ransom by the private owners of the generating station?

Mr. Probyn: There again, what I was suggesting is that the Ontario Energy Board would be setting the avoided cost. In a sense, it would be controlling the access to the system. You would have a long-term contract. Let's say it is 15 years; ours was 15 years for a particular set of reasons. At the expiration of that contract, in a sense the project must gain access to the system again. The contract would be negotiated with Hydro as the owner of the transmission, and then it would obviously be subject to the prior review of the OEB, so you are not held hostage, but neither is the private sector generator subject to Hydro's monopoly buying power.

Mrs. Grier: Presumably, especially given the Mulroney-Reagan deal, many of those plants could in fact be owned by the US at that point.

Mr. Probyn: That is right. They could, even without the free trade agreement. There are no restrictions under current Investment Canada regulations on foreign ownership of these projects. The project we have proposed for downtown Toronto would have been 75 per cent Canadian-owned.

Mrs. Grier: When you touched on the environmental control and regulation, you talked in terms of regulation of existing facilities. Do I take it that you are acknowledging the need for any private generating facility to be subject to the same approvals prior to construction as a publicly owned facility?

Mr. Probyn: I think so. I think there is another case in terms of ensuring that the review process is expeditious; there have been criticisms over the environmental assessment process jus because it takes so long to occur, so I think tha has to be rethought. But I do not see how an responsible person can say we should have on set of regs for private sector people in th environmental sphere and the government owned bodies should have another set. It does nc make any sense to me.

Mrs. Grier: Finally, if I can touch on you initial comments about demand managemen saying that Hydro's ability to do that, for variety of reasons, is very problematical: If it i determined that demand management is desi able for a variety of criteria, how should it b done?

Mr. Probyn: Unfortunately, we all live in th real world and demand management will have t be conducted at the retail level where power i sold–I should say at the retail and transmissio level. There are options like peak shaving an what have you which have implications for bot the grid and the retail distributor. There you hav to follow exactly the same process you have bee following, which is that some demand manage ment will be motivated by price consideration and will be undertaken voluntarily. To the exter you want to go beyond that, you have to have th political will to collar Hydro into doing what yo want it to do. There are no easy solutions.

1120

Mrs. Grier: Would you agree that that coul include very significant investment in incentive and in energy efficiency and the kinds of thing we have heard about from others?

Mr. Probyn: Absolutely.

Mr. Dietsch: I am wondering if you had give any consideration in your scenario to whether c not there should be public money as a catalyst t generate the private sector into this cogeneratio program that you are putting before us thi morning.

Mr. Probyn: I do not think so. I think that higher avoided cost will bring a lot of organiza tions and large and small companies into th generation market.

I found that grant assistance is, of all forms c government incentive, the most open to abuse t a degree. It also delays decision-making–yo know, government grants and what have you. would tend to be, as a general principle, against program of grant assistance unless it was, agair explicitly in furtherance of a government objec tive such as wanting more experimentation in th wind sector or something like that, but not blanket.

Mr. Harmer: May I comment on that? I am ooking at a project outside the province right ιow which involves major regional hydro levelopment. It is the type of thing in which we re looking at private sector companies being nvolved. We are also looking at two other rovincial utilities being involved.

I mentioned importing power early on. That is he type of thing that Ontario may wish to invest n simply to preserve the power developed in that roject as part of the power that would be used in)ntario in the future. I am not thinking in terms of grants as much as I would be looking at oossible interest in equity participation, but in hat sense only, in the same way that Ontario has nvested in other energy projects in the past.

Mr. Dietsch: The other question is in relevance to the environmental controls. You indicated in answer to Mrs. Grier's question that you eel that public and private should follow along he same types of criteria so that one does not ave a distinct advantage over the other.

Yet in your earlier comments under the policy considerations, I thought I understood you to say hat the public sector–I do not want to put words n your mouth but, as I understood it, your comment was that the public sector does not lways fall in line with the private sector with environmentally sound principles.

Everything I have seen leads me to believe the contrary to that. Do you have proof of those kinds of, I guess, allegations? What would lead you to nake that kind of a statement?

Mr. Probyn: For example, the worst polluter n Canada is the Sydney Steel Corp. which is owned by the government of Nova Scotia. The nost carcinogenic concentration in Canada is the ar ponds outside of Sydney, Nova Scotia, which were created by that company. As I said, I was eally–you are saying this for effect. I am sure here are good examples that prove the obverse of he case.

The general point that I wanted to make is that he public sector companies are often less subject o control than private sector companies because of their ability to influence government along the ines that they wish to pursue. Certainly Hydro's ecord in terms of environmental management as been exemplary. I would not want to be taken o be in any way critical of their record with the environment.

Mr. Dietsch: I guess the way I view it is that some of the other provinces in Canada are not quite as stringent as the province of Ontario. What leads me to scratch my head when you nake a comment like that is, for example, the Ontario Waste Management Corp; we had an opportunity in another committee I sit on to discuss its process as well. I tend to suggest to you that, although it is the practice in other provinces in the areas you cite, it is not the practice in Ontario. Ontario, by and large, is the leader in the whole nation with respect to stringent controls environmentally. It may be questioned by some that they are not quite good enough, but we are the leaders.

Mr. Probyn: Yes. Again, Ontario's environmental standards in the Canadian context are outstanding. I would say, though, that there needs to be a reform of environmental assessment if we are going to proceed along these lines, so that the private and the public sectors are on the same footing. Right now, actually, the public sector faces more stringent controls than the private sector, and there is an equalization of the regulatory burden and also a reduction of it, especially in terms of delay and the time it takes to produce a decision.

Mr. Harris: I have just one question. I know we are running out of time. I did not quite understand the assets that you felt Ontario Hydro had to sell. You indicated there would be these billions of dollars to put into all these other projects, which makes me very suspicious. Can you tell me how you arrived at these figures?

Mr. Probyn: Currently, the valuation at book value put by Hydro on its generating assets is around $16 billion. Of that, around $10 billion is nuclear, and I am not suggesting that nuclear be divested. The other remaining $5 billion or $6 billion is found in conventional plant, and that is both hydro and thermal. My view is that there are very significant plants that could be sold to the private sector and these represent assets that could be liquidated and used for other purposes. That is my only point.

As I tried to make clear, I do not regard this as integral to the reform of power production. I think it will speed it up, it will enhance private sector interest in the sector and it should be considered as part of the overall program. But it is certainly not the most important component, which is the restructuring of Hydro.

Mr. Harris: Basically you think there are $5 billion to $10 billion in assets that you could realize by way of sale?

Mr. Probyn: I would probably say under $5 billion at this time because I think the sale of nuclear assets would be too controversial.

Mr. Harris: If they were sold for, say, $3 billion in excess of the book value, presumably

that would be money that would have to be recovered. In other words, our hydro rates are too low, according to your projections–

Mr. Probyn: Not necessarily.

Mr. Harris: –to buy that amount of money, and the cost of carrying that amount of money.

Mr. Probyn: Hydro earns return on these assets. All you are doing is saying: "I've got this money in a bank account. It's invested and earning me a return on the assets." If I want to liquidate it and go and buy some other assets, I can do that. That is available to you.

Mr. Harris: The problem I have with your presentation is–and I understand what you are saying–to try to make it attractive you are saying, "You can build bridges; you can do this," which, of course, does not return a single nickel to us. In fact, it costs us billions of dollars along the way.

The other thing that bothers me with your presentation is that it is all premised on there being a great financial crisis and government not being able to borrow any more money. As critical as I have been over the past few years, how do you arrive at this?

Mr. Probyn: What I am saying is that over the past few years there has been a trend towards a reduction of the role of the public sector in the capital markets. There is a strong argument that the impact of public sector borrowing has been to keep up interest rates, and since there is a move towards reducing public sector borrowing, what I am suggesting is that this is one way of dealing with that problem. With regard to the infrastructure, you do not earn a return on a bridge, but you are going to have to build that bridge. That is not an option.

1130

Mr. Harris: I guess why I take exception to your proposing that is that you are comparing apples to oranges and trying to smoke that through a bunch of politicians, saying: "This will appeal to these suckers. They want to find the money to build the bridges." To me, the argument is so silly, to try to compare it that way, that I just do not understand why you would even try to make it.

If you are calling Hydro borrowing public sector borrowing, for which you acknowledge that Hydro in fact has substantially more capacity in the amount that it borrows–because you say there is $5 billion in excess capital in the market, and that borrowing is obviously guaranteed; I do not know how many private sector companies have a triple-A rating, which one of you indicated Hydro has–I do not understand why you say it puts more pressure on interest rates i Hydro borrows $5 billion as opposed to th private sector borrowing $5 billion.

Mr. Probyn: Part of the capital that would b raised would come in the form of equity, so it i not in the debt component of the capital market Essentially, what one is doing is reducing th impact, but the impact is there and I am not tryin to deny it.

Although you say that I am comparing apple and oranges, if you look at the British privatiza tion experience, that is exactly what has hap pened. British Airways, for example, has bee sold and the funds have been used for othe government purposes. That is what I am saying. am not trying to smoke you. I do not think it is silly argument and neither does Mrs. Thatche nor the entire realm of governments that are nov engaged in privatizing assets that are no necessary to keep.

Mr. Harris: Let me go back and say I agre with you. I agree with a lot of the competitiv measures that would be put into privatization. disagree with your coming here and telling m what we could use those dollars for. On the on hand, you talk about privatization. Why woul the dollars not be used to reduce the debt?

Mr. Probyn: Fine. I am sorry you tak objection to my suggesting bridges. I realize tha is a slightly impudent comment, but the observa tion was made in good faith. What I an suggesting is that those assets can be used fo other government purposes.

Mr. Harris: I had better pass.

Mr. Chairman: Mr. Passmore, did you hav a short question?

Mr. Passmore: I have a very quick question Mr. Probyn, you seem like a fairly enthusiasti entrepreneur. You must have looked around th province and decided there were some busines opportunities in cogeneration. Have you don any kind of assessment of what the market is fo gas cogeneration in Ontario? How quickly do w need to put the policy framework in place in orde to be able to take advantage of that potentia before we run into the problems that Mr. Harme outlined about gas markets getting tighter?

Mr. Probyn: One has a slightly empirica view of the market when one is in business, as am, so I cannot claim to have done a scientifi survey of it. I am aware, myself, of at least 1,00 megawatts of cogeneration projects that could b undertaken in all parts of Ontario. You ar talking to one individual who is out there in th marketplace. That says to me that if I know o

1,000 megawatts of projects that could be undertaken, there are all sorts of other people wandering around who know of a different 1,000 megawatts. That has to add up, certainly, in the 3,000- to 4,000-megawatt range. I think it is important, in that context, to move now.

Ontario has had a terrific time over the last three years under the new natural gas arrangements–the direct sale, the reform of gas pricing–and there are a number of Ontario industries which now have fabulous deals. As you will know, the Albertans do not see this in the same light. My feeling is that the terms of trade in gas over the next two years will start to turn against this province. You have had a lot less drilling, the economy is still expanding so demand is increasing and prices are going to start to go up. If we are going to deliver a lot of gas-fired cogeneration, we have to do it very quickly. The window of opportunity is a four-year window, say.

Mr. Passmore: You do not need to build the projects in four years, but you need to sign the 20-year contract.

Mr. Probyn: We need to sign the contracts, that is right. That means we are not talking academically about the reform of the system at some time; we are talking about now.

Mr. Chairman: You mentioned the cost of Atikokan generating at 17 cents. Hydro has passed a note to indicate that right now it may be as low as 10 cents a kilowatt-hour, and in fact the plant could produce at eight cents if there were enough water going over the dam.

Mr. Probyn: Okay. As I said, that was an anecdotal reference that a senior energy official mentioned to me last night. I should mention, of course, that Hydro would not buy that power at eight cents because that is double what it will pay a private generator for avoided-cost energy.

Mr. Chairman: I just thought I would put that on the table.

I thank you very much for coming in. We have probably gone on too long, but the topics you spoke about generated a great deal of interest. Thank you very much for appearing before the committee.

Mr. Probyn: It has been a pleasure. Thank you.

Mr. Chairman: I wonder if I could ask our next witness to come forward.

Mr. Brett, I ask you to introduce the members of your panel for the purposes of Hansard and then I will turn the floor over to you.

CANADIAN ASSOCIATION OF ENERGY SERVICE COMPANIES

Mr. Brett: These are the directors of the Canadian Association of Energy Service Companies. Starting on my far left: Hugh Sonnenberg, from Honeywell Ltd.; then Arnie Floyd, from TransAlta Energy Systems Corp.; Jim Rose, from Rose Technology Group Ltd., and Fred Day, from Econoler Inc. I am Tom Brett from the law firm of Johnston and Buchan, Ottawa.

Mr. Chairman: Perhaps you could start with a brief explanation of what the association is and then move on to your presentation. That might be the best way to do it.

Mr. Brett: The Canadian Association of Energy Service Companies was founded a few months ago by a group of companies providing energy services to energy users across Canada. The mission of the association is to become the primary nonprofit trade association representing companies and organizations which benefit from energy conservation through the supply or receipt of associated services and equipment. The association will further the growth of the energy services industry by focusing on the benefits to be obtained by energy users.

1140

What we would like to do today is give you a presentation on energy savings financing. Fred Day of Econoler, one of the member companies of the association, is going to give that presentation. All of the directors are available to answer your questions following Mr. Day's presentation. What I would like to do now, without any further ado, is turn the floor over to Mr. Day.

Mr. Day: Today, I have a number of acetates here. As such, I would like to walk you through an introduction to energy savings financing and the benefits that the province of Ontario, as a client, might be able to obtain from an energy savings financing program. I would like to invite the members, if you would like to interrupt me at any time, to please feel free to do so. If you prefer to hold your questions to the end and address us as an association, either way that you prefer, we have no objection.

Mr. Chairman: We have about an hour here, so if members could restrain their enthusiasm accordingly, we could do it that way.

Mr. Day: That is fine. This is an introduction to energy savings financing. I will run through it rapidly. As I said, feel free to interrupt me at any time and I will try to clarify any points. For the select committee on energy, this one is given by Econoler on behalf of the Canadian Association

of Energy Service Companies. We would like now to indicate to you what energy savings financing is.

Energy savings financing is the financing of projects from energy savings; that is, the difference between the cost of energy today and the reduced cost of energy after having implemented an energy savings program. The savings permit the realization of projects for which dollars may not otherwise be available. Energy savings financing mobilizes private capital. This means that from the standpoint of all of the capital investment in a program of this sort, the province would not have any capital or few capital funds to advance, depending upon the type of program, to see that the program becomes operable.

The contract options that we as an industry offer are the guarantee option or the fast out, the shared savings option, the client investment option or instalment contract and the guaranteed savings option. I will hit these again very lightly as we go through.

The first one is the guarantee option, which is one of the financing alternatives. This means you can receive from the energy service company either interim or permanent financing. The second option there is that the energy service company would then furnish the interim or bridge financing and the customer would reimburse the energy service company for the work, either from his own personal funds, because he has capital available to invest, or finance lease, operational lease or an instalment contract.

The guarantee option means that the benefits are that we provide the capital required to implement the project, the client repays the cost of the project plus interest out of the monthly energy savings–hence the name "savings financing"–and guarantees that the energy savings will be sufficient to repay the project cost within the guarantee period.

As an example, if the client and an energy service company enter into a contract and say they will pay out in five years and the guarantee is that the energy savings will be sufficient to pay out the contract in five years, this means that if the energy service company has advanced the funds, at the 60th month the client pays no further towards the amortization of the debt; or, in the case where the energy service company has provided a guarantee, then the client, of course, still has to pay his lender, but the energy service company will pay the client the unearned amount of energy savings so that he can retire the debt with his lender.

The shared savings option is also called chauffage, but actually chauffage is a misnomer, because chauffage in reality started in England with a fellow who had an awful lot of wood and an awful lot of pot-bellied stoves to sell. He decided he would give everybody a pot-bellied stove and sell them the wood at a little more costly price. He sold lots of stoves and lots of wood and that started the chauffage business back in the 1600s some time.

We have now a little more sophisticated application which is called the shared savings option. This means that instead of 100 per cent of the savings going to retire the debt, the savings are divided between the client and the energy service company. This means that the period of repayment will be in a longer contract period. It can go up to 10 years. However, for small and medium-sized enterprises, this is excellent because it means that the client ends up with a positive cash flow within his industry.

The client investment option: This means the client may invest up to 100 per cent of the project. To have a turnkey solution, the Econoler or the energy service company will provide the Econoler solution, the bridge financing, the technical guarantee and the savings guarantee for the client in question.

The other method of payment can be the instalment contract option. Just as when we go out and buy that new car we have been drooling over for the last six months, an Econoler and a client may arrange instalment contract financing in lieu of the client investment option or the lease financing option.

If we take a look at a typical project and take a look at the consumption–I will make sure I get it all on the screen for you; I just took the first six months here–you can see the difference. Up in the corner, R is for the representative year, F is for the forecast, A being the actual, or the dotted lines. I did not go the rest of the year because, in the particular model that I used, we were very fortunate in getting ahead of ourselves on this and would have brought all of the lines below the centre line. Then I would have had to explain to you why and then I would have taken too much time.

The guarantee option: When we provide the billing for the client, either for the energy service company's funds or whether it be for the funds that the client has borrowed from an outside source, we have the actualized reference-month consumption from the energy study at the beginning of the project. We then have the consumption for the current month. In th

10del, we say that we have saved $5,841.93. 'he balance from the previous month was 71,747. We added interest for the current 1onth, we added the energy management and 1onitoring services, and we have the new alance. We then subtract the savings that have een attributed for the current month, and we ave a new balance to go forward to the next 1onth and so on, until the capital debt has been mortized.

In a graphic form, this shows you what has appened. You will notice the broken line here. t was projected to pay out in 48 months, but in eality the project paid out in 36 months. The lient was very happy and he got to spend the lifference between his previous energy costs and is reduced energy costs a little more rapidly. 'he guaranteed savings program, again like the hared savings program, is more of a total nanagement type contract. This is total energy nanagement of the facilities. This means, very imply, that the client literally turns over his nergy budget to the energy service company. 'he energy service company then makes all of he necessary investments, pays all of the energy ills, maintains the equipment, trains the client taff and gives the client a guaranteed discount on he energy cost each year.

As an example, if they have a $100,000 energy udget for the first year, when they go into the ontract they might say, "We are going to give ou a five per cent discount the first year and five nd a half or six per cent the second," etc., so that s the savings increase, the energy service ompany then keeps the difference to amortize its lebt.

1150

The capital investment is totally by the energy ervice company, and the support of the capital lebt, interest and principal is by the energy ervice company and, again, all of the energy ills and operating expenses are paid from this evenue stream to the energy service company.

The project phases for all contract types are ssentially the same by any energy service ompany. We have prequalification, which will ee whether you really have a project that you can alk about to begin with or not. Then you do a letailed study, which confirms the feasibility of t from both an economic and an engineering tandpoint. You then implement the energy onservation measures and you do energy nanagement so as to protect the investment and nake damn sure the thing runs after you have it in lace.

Talking about the prequalification very quickly, the action is, first, the survey, when we identify and establish. We have the review of technical and economic feasibility. We then make a proposal to the client, where we indicate to the client, "We do have a deal that we can propose to you that would be financially viable." Finally, there is the letter of intent or study contract, which initiates the detailed feasibility study by the engineers in question.

What we are trying to determine in the detailed feasibility study is the actual audit, where we do onsite takeoffs and collect all the information and all the energy bills and we get a history and profile of the building. We see what the operating parameters and total energy balance are of the building. Then we review the measures, define the scope of work, finalize the cost/savings measures and the financial viability of the project and present the contract to the client for execution.

When we present the project cost breakdown to a client, it includes the cost of work and equipment; the cost of the interim financing; engineering fees for plans, specs and supervision; project management; ad men and overhead profit; total project cost, and the energy management, monitoring, personnel training and motivation factor, to follow through the project and keep it on stream after the measures have been implemented.

We then talk about the implementation, and this essentially means that the engineering is authorized and completed. We go to construction management, where we are calling tenders, obtaining the bids and awarding the contracts. Then there is the supervision and commissioning for the startup services, and then acceptance. At that time, if the Esco is putting up the money, then it will probably transfer the ownership to the client, depending upon its financial arrangement, or if it happens to be a lease or another type of instrument, the lender will receive at that time whatever legal instruments he requires.

Then energy management, which is the end result afterwards–it protects the end result–that is, we monitor the systems and monthly reports. That again shows the savings; that is all the fine-tuning as we go along. The energy management services provide the employee training and motivation, support and maintenance, and ensure that the savings targets are either met or exceeded. At the same time, which is quite important, we are able to identify additional energy savings projects for the client.

Employee motivation is very important during the energy management phase and every one of the energy service companies makes a great effort and takes pride in trying to get all of the employees who belong to the client on stream and part of the team.

In regard to the contractual obligations for the client in the marketplace, there is a prequalification to see whether there is a study or whether there is not. There is no real cost to the client. For the detailed energy study, if the energy service company declines, there is no charge. If the client declines, then he will be billed the cost of the study. If the client accepts, the study may either be paid for or rolled into the capital cost of the project.

During the implementation, the total project cost is recovered from the savings which are generated by the project. Energy management is also included in the guarantee and the cost of the energy management is recovered from the savings which are generated by the project.

We ask ourselves then: Why deal with an energy service company? I have engineers; I have project managers; I have a bank manager; I can do it all myself. First of all, I suggest to you: time–clients may have the talent and/or the people but not the time; experience–the energy service companies are specialized in the packaging and implementation of energy projects; risk–payment is subject to successful completion and obtaining energy savings. If you build automobiles, if you generate electricity, if you build refrigerators or what have you, you are not a specialist in completing energy service projects and obtaining energy savings. You may be damn good at what you are doing, but we feel that we are the best in our field.

We are also the catalyst where the energy service companies' performance-contracting guarantees permit the prioritizing of energy savings projects within a client's organizational structure. An example of that would be the Ford Motor Co. Demand for capital from all the different departments and plants is enormous, and the guy at the end of the line who is trying to get the energy conservation measures implanted in his plant always ends up as the last man on the totem pole, the last man on the line.

The guy at production says, "I am building cars. That is where the money comes from." The guy at the end of the line is trying to save money, so he comes up now with guarantees from an energy service company. All of a sudden, his project is on the same plane as all the other projects, even if Ford uses its own money. We guarantee that even if Ford uses its own money and it does not get paid out, we pay for what has not been amortized.

Financing should be the last reason to award an energy performance contract. Every project should stand on its own merits, and financing permits the realization of projects for which dollars would not otherwise be available.

To give you just a little bit of very quick background around the world–I am sure having trouble doing this backwards this morning, am I not? Anyway, we have Canada, the United States, Europe and the Pacific Rim, and these are areas in which energy-saving financing contracts are currently being exploited. You can get a very brief idea of the types of services. They vary a little bit, particularly in Europe where chauffage is probably more prevalent than in the other areas.

In the Canadian situation, there are approximately seven energy service companies. These energy service companies are supported by equipment manufacturers, energy suppliers, professionals and consulting engineers, specialized contractors, governments and utilities. The Canadian energy service company is maturing rapidly. It is concentrating its efforts and it is constantly innovating new services.

To visualize that for you a little bit, I would like to call your attention to the next slide which shows that, in the past, the energy service companies were pretty well limited to education, health care and commercial. Now and in the future, we are covering considerably more of the marketplace. We have retained the previous education, health care and commercial, and we are now into industry, energy from municipal waste, cogeneration, energy from industrial waste, industrial process, the maintenance of energy equipment, energy sales and energy management.

I would like you to remember that the flexibility of dealing with an energy service company provides an answer to the age-old battle of internal funds versus external funds and can be a way to overcome permanent or temporary funding restrictions. In the case in which people are dealing with public purse-strings, such as yourselves, then of course this means that there are no capital dollars with our program that would need to be advanced necessarily by the government. We are providing the funding. It would be a means for you to attain your end without having to advance capital funding for a particular program.

200

To give you an example, after an efficient dustrial application, we have fewer emissions nd more efficient energy processes. My slide is ut of order, but that is okay. We have less nergy in. We have more energy-efficient otors, more competitive products. We have a gh-efficiency, low-energy building. It was the verse, of course, before we did all these good ings. We were consuming more energy. We ad lots of emissions and black smoke coming ut the plant. We had fewer and more expensive oducts that the plant was developing.

We also have energy from waste and renew- ble energy. You will notice on this slide that we ave electricity produced from waste. We have a ini-hydro plant down at the bottom. Then we ome up with a ground source heat pump. We ave energy from waste being burned and oviding steam. We also have, from the ogeneration standpoint, biomass fuel and co- eneration.

It is not your case, but if you go to St. John's, ewfoundland, everybody is really happy about ibernia and so forth. They have forgotten that ey also have up there 500 years' equivalent of umber two fuel oil at current expenditures in eat to be reclaimed and burned. There are a lot opportunities around Canada for us.

In this particular case you will see that we have ogenerated electricity, fewer emissions, less oil nd all of the biomass being consumed going into is plant which will be a pulp and paper ant–that is the example–using high-efficiency oilers. They, of course, would use the biomass el which is being generated.

We have also the thermopress technologies ich as the one that is currently being used out at e Lester B. Pearson airport. This uses industrial omestic waste and biomass. The briquettes can ther be stored or they can be burned depending pon the process that you want to utilize.

I would like also to remind you that the energy rvice company team provides the whole gamut f services for the client base; that is, under one oof they provide engineering support, project anagement, construction management, energy anagement monitoring and financing, if and hen required.

So then, we would like to ask our questions. Ve would like to ask our clients: "What is conoler? Why do you want to do business with s and why should you?" We are just another one f seven energy service companies in Canada. Ve feel that Canada's pioneer energy service ompany specializing in performance contracting can bring credibility to our association. We can also be an important interlocutor with you in this committee in your deliberations.

We would like to give you an idea of where we operate, very quickly. Overseas we have Singapore, the Netherlands, France, Luxembourg and Belgium and we have our office opening in Spain in two months. In Canada we are in Quebec, Nova Scotia, New Brunswick, Prince Edward Island, Ontario and St. John's, Newfoundland. In the United States we are pretty much on the east coast, with one office in Detroit, another one in Lansing and another one in San Francisco.

I would like to share with you very quickly some of the information that you found on the pass-out that I gave you. Speaking of pass-outs, my apologies, but with modern technology, the pass-outs were all supposed to be here by 11 o'clock. We got a phone call that they will be here at 1:30, so you will get them this afternoon. Very quickly, you have the pass-out here that we had copied for you. I think you might find this information of particular interest to you.

This is what our sister firm that we have in the US has been doing. It has turned out some very good contracts with the Massachusetts Electric Co. I will not go into the details of the programs; you have them there. Jack Roll, who is our vice-president there, said he would be happy to make himself available to the committee if you would like to invite him here to talk specifically on this project or any of this. His phone number and everything is there; you can contact him.

Then there are Commonwealth Electric and Northeast Utilities. We have also the Boston Edison Co. avoided cost of power generation; Central Maine Power Co., and the New York State Public Service Commission. There is one thing that runs through here and it runs true all the way through, that is, in each case the states in question have required that the programs be delivered by qualified Escos and people who have the wherewithal in performance contracting so as to protect the public from fly-by-nighters.

I want to leave some question time. We feel that our strength is based upon the regional engineering partnerships, because in every place we do business we do business with regional people and by associates here in Ontario. Again, they do the same thing, and when they are out of the province, they also have regional people.

We feel that the energy service companies identify energy projects and convert the savings into a revenue stream. That revenue stream then permits the amortization of these projects,

without utilizing public funds in your particular case.

I would like to remind you that the traditional approach is the fellow in the middle who is scratching his head and trying to juggle all the balls of the different services and to know where to go and what to do and how to do it. We like to feel that the Econoler or the Esco approach is one where we are the catalyst. We have been there, we are there and we will be there, and we can provide this service for you under one roof. Any one of our members can do this for you.

You might also like to know that, from Econoler's particular standpoint, being Canada's pioneer Esco, we have over $100 million invested in energy projects to date. I think it is now $130 million, to be exact. It is invested in more than 700 buildings and we turn out in excess of $30 million annually in savings. Just as a very rough calculation, it came out to about one million megawatts annually.

Mrs. Grier: Are you talking Canada, Ontario or generally?

Mr. Day: This is Quebec, Ontario and Atlantic Canada. Nothing west, nothing in the US. It does work. The benefits are reduced energy costs; maintained or improved comfort levels; upgraded physical plant with no capital costs; improved maintenance program; upgraded level of trained staff; motivational program for the staff, getting them on board, making them feel part of the team; new equipment ownership; guaranteed results, and state-of-the-art technologies.

I would like to remind you that you have the different contract options we discussed: the guarantee option; the shared savings option; the client investment option, and the guaranteed savings option. We stole this from Ford. We like to think that savings financing is a better idea.

We feel that the benefits to Ontario could be program promotion and delivery by the Canadian Association of Energy Service Companies; all or a portion of the capital investment provided through the Escos; facility of dialogue; performance contracting in Escos, and facility of control or monitoring of programs and/or their delivery. That is what we can do for you as an association and we are open for questions in either official language.

Mr. Passmore: You put up one slide there that said something about one million megawatts. Do you mean one million megawatt-hours? There was a slide there where, at the bottom, you said a rough calculation on what your savings were.

Mrs. Grier: The third or fourth from the end.

Mr. Day: I was not even in the office and I asked the slide to be done and I did not go back and calculate it.

Mr. Passmore: Fine. I just wondered.

1210

Mr. Day: It was probably megawatt-hours, because it is $30 million per year, and that would be megawatt-hours, I am sure.

Interjections.

Mr. Chairman: If that was the whole presentation, is your panel available for questions?

Mr. Day: Yes.

Mrs. Grier: Let me just clarify that last slide. You talk about energy; you are meaning all forms of fuel.

Mr. Day: Yes.

Mrs. Grier: Yet you calculate in megawatt-hours.

Mr. Day: We just converted.

Mrs. Grier: Everything.

Mr. Day: In other words, we took the dollar savings, and this is just for my company, but we took the dollar savings and then converted it to electricity to have one common ground. I could have changed it to BTUs or cubic metres of gas.

Mrs. Grier: Can you give me any idea of the proportion of your business that in fact saves electricity? How big a role does that play?

Mr. Day: I would say probably 80 per cent.

Mrs. Grier: And what is your relationship with Ontario Hydro? You talk in the States about working with the utilities. Do you have any kind of similar relationship with them?

Mr. Day: We do not because as an association we would like to enter into some negotiations with Ontario Hydro.

Mr. Brett: Hydro has no such program.

Mr. Day: They have no such program at this time.

Mr. Brett: Nothing analogous to those American programs that were put up on the slides.

Mrs. Grier: You talked about the need for reputable companies. Are there in Canada any criteria to determine qualifications of an Esco company, or does that not exist because there is no program?

Mr. Day: I would say that the criteria has been developed by the federal government because the Fedsave program, the qualification document

ill be out on October 3, and then only those nergy service companies which have been blessed" by the federal government will be onsidered to be those which are qualified in the narketplace today. This does not mean that thers will not be qualified in the future.

Mr. Brett: That is one. If I may just add to hat, that is one way in which it will happen. The ssociation is also developing a code of ethics, or statement of qualifications if you like, that nembers would have to comply with if they were o remain members. The companies that we have ntroduced to you this morning are all major orporations that have been in this business for a eriod of time either as their sole business or as part of much larger corporate organizations.

Mrs. Grier: Why is a program needed from Hydro? You are working now with individual ompanies and industries on your own. What ole is there for Hydro in expanding this operation?

Mr. Day: As I understand, Hydro would like o reduce some of its load and avoid having to pend capital dollars for new generating facilities. The programs that you saw noted on the board in the United States are as a direct result of northeastern corridor utilities following the same path. They would like to be able to have more electricity available for the marketplace without necessarily generating more electricity.

Mr. Brett: I think it would be fair to add that our group has not addressed in detail the issue of what Ontario Hydro should do specifically to ncrease the amount of performance contract in savings financing in Ontario. What we are trying o do is give you a statement of what savings financing is all about, to give you some information on what some of the US utilities are doing. From there we intend to have further discussions with Hydro, bilateral discussions between the association and Hydro, as to what they might do in this respect.

Mr. Sonnenberg: May I add what your own government is doing. As a Honeywell representative, we are doing a major shared finance program for the Ministry of Transportation on Keele Street, which is a seven-year payback period. After it is all done, the Ontario government will benefit to the tune of $640,000, having no capital expenditure.

What we are really saying is, if this can be done for the Ontario government we ought to do it for many more clients, not only for the government, but also for Ontario Hydro, major clients.

Mr. Day: There is a major sphere also from the federal government's standpoint. It has 3,300 buildings it would like to have energy retrofits done on. Its program would start this fall, and it would be totally administered by the Canadian energy service companies.

Mrs. Grier: Would you be prepared to take on this building?

Mr. Day: Any day. If you are prepared to sign a contract, I am prepared to take it on, and any one of these guys will give you a fair bid on it.

Mrs. Grier: One final question, if I might. One of the things this committee has been talking about is load forecasting and trying to estimate how much savings is in fact out there and the inability of Hydro to do that accurately because of the absence of any end-use data and real information about what the potential might be. The experience that you or your member companies have obtained is obviously going to be part of filling that gap. I am wondering, have you ever been asked for your advice or the benefit of your expertise, or is there data or information available that could be shared with Hydro?

Mr. Sonnenberg: We might be willing to share our own experiences and information pertaining to specific jobs, whether they be institutions, hospitals, your government or any other undertakings we have done. We would be willing to give them our energy calculations and our savings per project, but we could not comment on the other for Ontario Hydro; we have no such information.

Mrs. Grier: But presumably one can generalize. If you know that a hospital of a certain size there has been a saving of this amount, it is presumably possible to extrapolate from that and make broader forecasts.

Mr. Sonnenberg: Yes. That is correct.

Mr. Day: I can also tell you, being a member of the governing council of Canadian energy management task forces, that this is a problem. In fact, yesterday we attacked the commercial and institutional sectors in Canada and we are trying to come up at this time with a database. As to hospitals, I can put my hands on it for you rather rapidly, if you would like it; any other health care information, within about a week I can dig it out for you; schools, it is available, but you have to dig a little further. If we come to commercial buildings, it is practically nonexistent unless we go to the Building Owners' and Managers' Association and the Institute of Real Estate Management and we get some of the publications. But even then it does not give you a

clear and concise measurement for all of the central population centres. We are trying to throw this in and we are working with the Department of Energy, Mines and Resources at this time for the studies to see that this does get done.

Mrs. Grier: Thank you very much.

Mr. Harris: I enjoyed your presentation, by the way. I am just trying to get a handle on where government fits into what you are doing. Are there any legislative or regulatory impediments to your functioning in Ontario today?

Mr. Sonnenberg: No, there are not.

Mr. Brett: There are no legislative, I do not think.

Mr. Day: Let's take an example. I do not think there are. In Quebec, the only thing that we had to get done, and in Newfoundland right now, the facilities that obtain their operating funds from the government then have to have permission to freeze their energy budget for the term of the contract. Newfoundland has gone a step further. It has said: "Well, we will freeze it. If the contracts are five years, then we are looking at freezing it for 10." So when the project is paid out, you have five years of that gravy that you could use and reinvest in your building, hospital or operation so that institution has a little bit of appetite; they have a carrot to run after. Does that answer your question a little better?

Mr. Harris: So you are saying if Ontario guaranteed that any energy savings could stay with the institution that we are funding, that would be an added incentive.

Mr. Day: That is right. That is important. That would be an added incentive because otherwise you say, "Well, hey, you used an energy service company; they have put all new equipment in; they reduced your energy. Huh, give me."

Mr. Harris: Jim, could you speak to that issue?

Mr. Rose: Yes. Several years ago, perhaps five years ago–we have been in this business for a long time–the Ministry of Health that we were working with would fund a retrofit. For instance, at the Etobicoke General Hospital, as consulting engineers at that time, not Esco's, we organized a program where we spent about $500,000 with the prospect of saving $200,000 a year. It was a very good one and the Ministry of Health funded it, but they decreed before it started that they were going to cut the energy allocation to the hospital by $150,000 a year. That has changed.

1220

Now if we go into a hospital–and we have about eight hospitals on the go–the fact that the hospitals are saving 25 or 30 per cent of their energy is not affecting the payment from the government. Keep in mind that if we invest $500,000 on a five-year program, we have to save $100,000 a year. Therefore, the hospital is not going to see any savings for five years, but after that, it will have $100,000 that it would normally have spent on energy that it does not spend on energy and which it can spend on something else. The government now is not taking that back. That was a change from the Ministry of Health about three years ago.

Mr. Harris: I understand why that is popular with you. I am not sure that is necessarily what the government should be doing, but I do understand that it provides local motivation for the employees and the staff.

Mr. Rose: Precisely.

Mr. Harris: Perhaps some of that should be there. If, in fact, the government's interest in what you are doing is to reduce overall energy consumption–and I think we are, as a government, interested in that–then there is some benefit. If we are interested as a government in saving dollars as well, putting that hat on, then I am not so sure what you are suggesting is a particularly wise decision.

The Ministry of Health has made that decision now. Other than recognizing that you are there helping to encourage and promote industries in energy conservation, other than our overall interest in reducing energy consumption and your direct involvement with government, you do not feel that there are regulatory or legislative impediments to what you are doing right now?

Mr. Brett: No, I do not think so. Let me put the general issue to you. Without being able to be very specific at this stage, the association has been invited by Hydro to make representations to it on how it might work with Hydro in the delivery of energy conservation services, but I think the broad issue really is how Hydro can work with members of this association to leverage its investment in energy conservation and energy efficiency activities. We do not have a specific answer to that today. We have shown you some examples of how various American utilities have done so.

In the historical perspective, I think it is fair to say Hydro is just beginning to seriously address demand-side initiatives in detail, in hard concrete detail, as a major corporate initiative. I guess we

'e raising an issue for the future, and we think e can work with Hydro to push this along much iore quickly than it would otherwise go.

Mrs. Sullivan: I have a couple of things. I am uite interested in your experience in utilities in merica, and I am wondering if the reason they ecame interested in involving the private sector these energy efficiency program plans was to et out of the incentives on their own. Had the tilities themselves been offering efficiency centives?

Mr. Day: They have been, and they are inding that down just as the federal government ound down the Canadian home insulation rogram and those types of programs. They want e energy service companies out there to do that r them so that they do not have to fund those rograms. They have some that are winding own where they are still paying $500 or $700 er kilowatt saved, but even that is peanuts in omparison to what it would take them to put the hole program on line with a system of grants, e personnel to operate it and that type of thing.

Mrs. Sullivan: In your view, was it important at the utilities had been in the incentive usiness before to build a base, by example of ositive experience and indeed involvement in fficiencies, whether in the industrial or institu-onal sectors?

Mr. Day: I would say there was not previously at much experience in the marketplace, be-ause if you take a look at what is happening just New York state right now, New York has gone the utility companies within the state and has sked them to come back with the terms of a equest for proposal going out to the private ector to provide these services. They have no xperience. They are going to have to turn to the eople in Boston and Maine to obtain that xperience, so that they can build their RFP and o out and get qualified performance contractors provide the service for them.

Mrs. Sullivan: When you go into a region or vhen you are working with a utility, and resumably it asks you to bid, does it ask you to id for a region with a specific target of demand eduction?

Mr. Day: They can ask for demand reduction, hey can ask for straight conservation, they can sk for power supply or they can come out and ay, "We want so many megawatts; give us a bid n it." There is a multitude of answers to that. I lid not know whether I should ask my vice-resident from the United States to come up here r not. I said no, that I would give you enough information. If you want some more, he said he would come up and address the committee at any time if you would like him to. He has lived with it for about four years and would be able to give you a really good inside knowledge of that if you would like it, but I did not bring him with me.

Mrs. Sullivan: No, that is fine.

After the utility has determined its targets, you are then free to go out and knock on doors basically until you get the clients to meet them.

Mr. Day: That is right. In Massachusetts and Boston, they have divided it up into geographical areas, and the utility has indicated from its billing procedures those companies that are consuming the greatest amount of electricity and those that are pushing the demand factor to the limit or going over very frequently, so it can go out and get those clients on line first.

Mrs. Sullivan: Then, to reach those clients, has the utility already done a marketing program that makes it possible for you to in fact enter the market?

Mr. Day: I cannot answer that from a firsthand basis. From a secondhand basis, I know that the ground had been worked over a little bit, but to exactly what extent, whether a representa-tive from the utility had been to the client company or whether it was by mail, brochures or what, I do not know what steps there were. I know the ice had been broken, but specifically I do not know how.

Mrs. Sullivan: I was thinking that perhaps if Ontario Hydro were to look at this, it would also have to be looking at substantial marketing support for the program.

Just moving completely away from that, has your organization, or members of it, had experience in the residential sector?

Mr. Rose: For the most part, I think not.

Mr. Brett: Not the single-family residential sector. The problem is the size of the project and the ability to cover your costs and have a successful business. Our members have concen-trated on the commercial, industrial and institu-tional sectors, as have most Escos across Canada and the United States. There are very few, if any, that I am aware of that I would really call Escos, that have specialized in single-family residential.

Mr. Sonnenberg: One of our divisions specializes in residences, supplying various gas burners, high-efficiency products, which are really consumer or residential products. The technology cannot be improved year to year because we have peaked at the top efficiency as far as residences are concerned. I would think

that the general public is extremely aware of having storm windows, extra insulation and so on.

1230

Mrs. Sullivan: I was wondering about any co-operation, say, with new residential developments and so on.

Mr. Day: The Canadian Home Builders' Association is now taking over the delivery of the R-2000 program for the Department of Energy, Mines and Resources.

Mrs. Sullivan: They are going to be here this afternoon.

Mr. Charlton: Just a couple of brief questions. This committee in its last two and a half lifetimes has heard a fair bit about energy saving in some of the jurisdictions in the US, for example. They are fairly far along that road. A lot of the jurisdictions you mention in the handout you gave us we have not heard much about. Obviously, for example, in the Massachusetts case, the program you are citing here is a very new one; it just started this spring.

Are you finding in 1988 that a lot of the jurisdictions in the US which have not been doing too much along these lines are coming out with programs as a result of what is going on in some of the other jurisdictions and that there is a fairly major escalation in terms of interest on the parts of New York state, Massachusetts and others?

Mr. Day: Very definitely. Vermont is coming on stream also. A good deal of the New England power pool is coming on stream with that. In fact, I am involved in an organization of premiers and the New England governors. It is a regroupment of all of the provinces and the northeastern states. They consider that energy conservation is an energy source, particularly as they are coming under so much flak about the electricity which is being generated by fusion–nuclear. There are some serious threats that they are going to be shut down in some of those places and they have to replace that energy.

Mr. Charlton: The other question that flows out of that for me is: Do you have any sense in the US as to the involvement by government in some fashion in terms of energy conservation and the relationship between that and the level of business your companies find in those states? To put it another way: When the government gets involved, do your companies find that opens up an access to business in that state that is difficult to get at?

Mr. Sonnenberg: I would like to answer this. Our world headquarters are in Minneapolis in the state of Minnesota. They legislated two years ago and our activity almost quadrupled in two years. Not only ours but also our competitors' and other Escos'.

Mr. Brett: The other observation I would make is that I think the regulators in these states which have the programs you have just described have been critical in getting those programs off the ground. I am not an authority on the US power market, but we are members of American trade associations of Escos and cogeneration companies and my sense is that the activities of the utility regulators, the state public utility commissions, have been critical in nudging the utilities along the path of competitive bidding for energy savings, energy demand-side activities generally, private power.

You have heard all sorts of witnesses on private power, we do not have to talk about that. As you are well aware, that has been a regulator-driven phenomenon to a considerable extent. I think it is a fair surmise that the same would be true here.

Mr. Chairman: I want to ask one brief question on what might be considered the market for this. Hydro, in its DSPS, has set a target of something in the order of a 5,000-megawatt reduction in its demand by the year 2000. If we project the present growth, that is something less than a two per cent reduction in what would have been the demand in the year 2000. Hydro can tell me if I have the numbers right; I am a lawyer, not an accountant.

That does not seem to be a large target when I see here in one of your projects in the states that Econoler USA is going to reduce demand by four per cent. Admittedly, that is with a certain chunk of people, not the whole economy. I am wondering if your group has any feel for whether Hydro's target of 5,000 by the year 2000 is realistic. Is it low, or could there be more?

Mr. Brett: I do not think we have done the analysis to be able to say. We can tell you more from the ground up, what savings can be realized in individual projects. In institutional and commercial, we can give you a very good sense of what is achievable because we have done it. The members have done it over the years in many hundreds of hospitals, schools, universities, commercial buildings and some industrial plants. That is the sort of place we can give you the most help, from the top down and you would have to extrapolate from that. You have to do a lot of number crunching to comment usefully on Hydro's own projections on what those savings would be.

Mr. Chairman: The reason I ask is that there s been some commentary from some sources at that number may be conservative, which I ess is understandable when you are looking at new area. I just wondered if you had any sense all of what your group felt might be your arket in the next 10 years and how much you uld sell of this and how many megawatts–

Mr. Brett: The market is enormous, in the nse that the only sectors that have been really enetrated to any degree, as Mr. Day said earlier, y the energy service companies are the hospi-ls, the institutions, schools and some govern-ent buildings in some provinces–very little in ntario, I might add, and very little in the federal overnment, but quite a few in the eastern rovinces. So many of the other sectors are really ill to be addressed.

Mr. Rose: If I may say something to that, ere is a very concrete reason why the energy rvice companies have stayed with the institu-ons. Keep in mind that we borrow money from e banks, and it is a nonrecourse loan. The banks o not take out mortgages or anything else on the roperty that we are working on. You have to ave triple-A credit ratings or the bank will not nd us the money to work on your buildings. herefore, who ever heard of a hospital going ankrupt, a university or a school? It is a credit tuation. We have done a lot of work as onsulting engineers in the high-rise residential arket, but we will not touch that market when e are funding it and guaranteeing it. They do ot have the credit.

Actually, we had a question from Mrs. Grier bout the ratio. In hospitals, we say it is a 50-50 plit between electricity and gas. In universities, e are finding it is about a 60-40 split: 60 fuel and 0 electricity. We have a good database on the overnment-funded market. That is where our arket is. It is guaranteed.

Mr. Chairman: In those buildings, would ou have been able to reduce their demand by, ay, two per cent, three per cent, four per cent? What kind of impact would you have had on their lectricity demand?

Mr. Sonnenberg: A heck of a lot more than hat, considerably more than that. If we reduce he power consumption by 30 per cent or 25 per ent, obviously, the demand load goes down onsiderably.

Mr. Brett: The rule of thumb–I think nembers would agree–we use on a hospital for otal energy-consumption percentage reduction would be more in the order of 30 per cent to 40 per cent.

Mr. Chairman: Of electric consumption?

Mr. Brett: Both electric and fuel.

Mr. Chairman: Would it be fair to conclude that you might have the same impact in a factory, or is it perhaps more efficient to start with?

Mr. Sonnenberg: Yes, that is right.

Mr. Chairman: You would be fairly confident predicting you might be able to knock 20 per cent or 30 per cent off the demand of any client you took on.

Mr. Sonnenberg: Yes, I think that is correct.

Mr. Brett: Unless the person has done a very, very aggressive conservation program over the years with his own funds, and not that many have.

Mr. Chairman: That is what I am just wondering because it may be that the sector you were in, universities and hospitals, perhaps has not had the incentive in the past, whereas some factories may already be efficient.

Mr. Sonnenberg: If you look at the health care market and the total funding of a hospital, between five per cent and six per cent of the hospital funding is allocated for energy, and these are the energy costs. We can say that out of the five per cent to six per cent on an energy or guaranteed savings program, we could almost save them 1.5 per cent per year, to a limit. We have that experience. I believe this is true for TransAlta and anybody else here.

1240

Mrs. Sullivan: I have a supplementary about the aftermath of efficiency programs in the industrial and manufacturing sector. Presumably, when a retrofit is done or changes are made, those changes will include new equipment and new technologies that indeed increase production?

Mr. Sonnenberg: It also increases comfort, which is very important today for the labour force. We are going away from the sweatshops and so on. I think this is critical as well for overall wellbeing, health and so on for our people.

Mrs. Sullivan: When production increases, are you seeing a concomitant increase in fact in the use of energy because of longer production runs and so on? In fact, is there more efficiency, more productive work, but no less demand on energy supply?

Mr. Day: I would answer that by saying there is a productive utilization of energy. If instead of 800 cars, they are turning out 1,500, they are

going to use more energy, but they are going to use less energy per car for the production of that automobile.

You were asking about the percentage of reduction. I can give you another example that we have run across in St. John's, Newfoundland, again. I never thought I would run across something like that, but since the Come by Chance refinery has come on line, it is turning out a lot of propane gas, so now a lot of the people looking at cutting the peaks off the electrical consumption are using propane gas for those peaks. At the beginning it was 45 cents a litre; now it is down to 15. At 15 you can afford to do it; at 45 you cannot.

Mr. Passmore: I do not know whether I missed this or not but I just wanted to make it clear to the committee members that in fact the technology you are talking about doing these energy savings with is not necessarily complicated or high-tech technology, but it is fairly well proven.

Mr. Brett: Yes, that is absolutely right. We are not talking about demonstration projects here, research and development or anything like that. Most of this technology has been available for years and, in some cases, decades. It is really a question of deployment and implementation of it.

Mr. Rose: There is possibly one exception to that. That is what is called direct digital controls, replacing pneumatic and electronic controls. We could not do the things we are doing now 10 years ago, but with DDC, you put a system in, you tell it what to do and it does it.

Mr. Sonnenberg: And you do it remotely. We are monitoring a hospital in Newfoundland from Toronto. We have over 900 buildings across Canada which we are controlling through Toronto. So that technology is available and proven.

Mr. Passmore: So high technology makes you more efficient?

Mr. Sonnenberg: I am sorry?

Mr. Passmore: High-technology computers make you more efficient in saving energy?

Mr. Sonnenberg: Yes. They are a major manufacturer in this field which can supply this equipment very successfully.

Mr. Passmore: I am interested just in one final question: the fact that you say it has been regulator-driven in the United States and that perhaps the same sort of approach could be taken here in Ontario.

There have been recommendations by some witnesses who have appeared before us thus far that perhaps it would be desirable to have goals set by government, i.e., policies set by government but then implemented by the utility, but that some body would oversee that the utility would follow through on these goals. It has been suggested that that body could be the Ontario Energy Board. Has any thought been given to that by your association or do you have any comment on those sorts of deliberations that are currently before the committee?

Mr. Brett: I will make one comment. Other members here may have a comment. We do not have an official position on that. In the United States, though, as you are well aware, the electric utility industry is regulated by the public service commissions of the relevant states, just as the gas industry is. That is point one.

Point two is that, in my view, the activities of those commissions have been critical to the development of both the private power option and the energy demand-side programming by the various utilities.

Point three is that, as I understand it, we do not at the moment in Ontario have regulation in the real sense of the word by the Ontario Energy Board of the electric utility industry. We have regulation in the gas industry but we do not have regulation of the electricity industry. That is as far as I really can go. My personal view would be that it would probably be a helpful thing, but I stress that is a personal view.

Mr. Chairman: Mr. Brett, I would like to thank you and your committee for coming before us today. Again, we have run over time, which shows how interested the committee is in what you meant. I do not think you should take the fact that a few have slipped out over the last few minutes to be an indication they were not interested in what you were saying.

You can be sure that I will pass on to the Speaker the interest of your group in attempting to reduce energy consumption in this building. It might be a worthwhile project. We might even balance the provincial budget if we could accomplish that. We will pass that on and see what we can do. Thank you again.

I will adjourn the committee until two o'clock this afternoon.

The committee adjourned at 12:46 p.m.

AFTERNOON SITTING

The committee resumed at 2:11 p.m. in room 28.

Mr. Chairman: I call this afternoon's session to order. Everybody is already seated, so I will not invite everyone to be seated. This afternoon, the first witness is from the Ontario Home Builders' Association. We have asked them here specifically to talk to us about the R-2000 home and some of the other energy conservation things that are going on. Mr. Duffy, I wonder if you would introduce the other member of your panel to us and then I will turn the floor over to you for your presentation.

ONTARIO HOME BUILDERS' ASSOCIATION

CANADIAN HOME BUILDERS' ASSOCIATION

Mr. Duffy: I would like to introduce Don Buchan from the Canadian Home Builders' Association. Mr. Buchan is the national director of the R-2000 program for the Canadian Home Builders' Association, so we felt it appropriate that we be able to give both an Ontario regional flavour and a national flavour to our presentation. I am going to call on Mr. Buchan to do a bit of overview of the national program before I get started on the meat of my presentation, so I would like to introduce the committee to Mr. Buchan.

Mr. Buchan: I would like to give a very brief overview of the program, its history, where it came from and how it fits in a national context. The program was jointly developed by industry and government on a federal level and dates back really to about 1978 when it originally started. The program, although it was not originally called the R-2000 program, has been in existence for something in the order of 10 years now. It took on the name of the R-2000 program some time in 1982 and has developed since then into the program it is now.

The original approach was a co-operative, industry-government effort in order to try to promote energy-efficient housing in the new housing sector by involving the industry directly, as opposed to imposing a legislated standard on the industry. Effectively, what we were trying to do, I guess, was avoid some of the pitfalls that had happened with things such as the measures for energy conservation, developed on a national basis in 1978 and revised in 1983, which had been accepted by the research community on a consensus basis, but had not been accepted by the building industry and were never really implemented on a national basis.

What the R-2000 program effectively did was come up with a voluntary consensus standard, much higher levels of energy conservation than had ever been thought of through these earlier efforts. It was strictly voluntary and was accepted very widely by the building industry. The program was seen to be much wider, much broader than just energy, because of some of the pitfalls, again, which were beginning to be seen in energy-related housing programs. If you deal with the energy issue separately from other elements of the house, you end up with a number of the problems that we hear about in the news media currently.

The R-2000 program was developed really as an approach to energy efficiency in a safe and cost-effective way. That was the background. The real issues we were dealing with were the energy conservation aspects, the integrity of the building structure itself and, probably the most important items, occupant safety and occupant health. We will give you some more detail later when Mr. Duffy speaks on specifics in that area.

Probably the most important thing that this program has had is the time we have had to develop it. The program is only now becoming widely accepted across Canada as the standard for housing at the high end, as far as energy conservation goes. As I said earlier, it has been in existence for close to 10 years; it has been in existence for about six years in its current form, as the R-2000 program.

The importance there is it allowed us to do all the things that you want to do in developing a program right at the beginning before you get into a massive marketing effort. We can cite numerous examples of similar-type programs that were developed, particularly in the United States, where there was an immediate need from the very beginning to develop a very large marketing effort, but the basic technology was not developed properly, nor were the people really put in place to deliver what the program was supposed to be delivering.

The R-2000 program really was a three-phase program, and we are heavily into the third phase now. The first phase was developing the technology in a very comprehensive way, dealing with a very small number of houses built

to the standard and ensuring that we were doing things right. We did not do things right in the first place and went back and did a lot of remedial work on those initial few houses.

The second thing we did was retrain the industry. That was probably the most important step, because we were retraining the industry to deliver a product, this product being the R-2000 house. As I say, it has taken a number of years to get to the point now where we can comfortably and confidently market R-2000 housing across Canada, knowing the goods can be delivered and knowing we do not have any technical skeletons in the closet that are going to come back and get us later.

The time to do it right is probably the most important aspect, and fortunately we were given the money and time by the federal government to do that in a very co-operative manner. The program is becoming very much an industry-driven program now. The Department of Energy, Mines and Resources is backing out of the program, in both a monetary and a control way, and the program is very much vested within the Canadian Home Builders' Association at this point. It is delivered across Canada in all regions and, as I say, it is now becoming a major marketing effort in the new housing sector.

I leave my introductory remarks on the national program to that and turn the floor back to Paul Duffy.

Mr. Duffy: I think it is quite appropriate that the control and the drive behind the program are being vested with the Canadian Home Builders' Association nationwide and the Ontario Home Builders' Association.

For the information of members here present, the Ontario Home Builders' Association is an industry association that represents various disciplines. Some 3,200 member companies represent everyone from bricklayers, land developers and trades contractors through architects and engineers, so we have the broad-based support in the industry to effectively deliver such a comprehensive program.

It is often said that a picture is worth a thousand words, so to introduce the R-2000 house to you, what I propose doing is showing a few slides. Maybe this is the appropriate time right now. Various people in the room may have different levels of knowledge and understanding of the R-2000 program, coming from some of the early publicity and some of the publicity that they have seen more recently. What I would like to do is walk you through exactly what is involved in an R-2000 house to dispel any myths you might have and so that you know what we are talking about.

Some people in the room may have a mistaken belief, and I call it a mistaken belief, that an R-2000 house has to look like something in the previous two slides. This slide is in fact a typical R-2000 house in southern Ontario. It is like any other house that you would see in any subdivision in Ontario. The difference in this house is how it performs, and how it performs is fully a function of how it is put together and the materials that go into it.

What is an R-2000 house? It is a house built by a certified R-2000 builder. It is passed through a design review and inspection process. It has five key elements that typically show up in most of the houses that we see. High insulation levels are an obvious one. What might not be as obvious to many people is a continuous air barrier. What that provides is resistance to draughts. It also controls moisture that may get into the structure.

1420

An R-2000 house brings with it not only energy efficiency but a very high degree of durability. Typically, we would have a better grade of windows and doors in the R-2000 house, part and parcel of the comfort levels and the energy efficiency we are trying to deliver.

High-efficiency space and domestic hot water heating systems are very common these days, more common than they were before the R-2000 for some of the reasons that Mr. Buchan has outlined. What you may not be aware of is that typically these units tend to be sealed combustion devices which protect the indoor air quality of our occupants, so it is a key one we like to emphasize.

One of the aspects you might not be used to is a mechanical ventilation system, and I will go into that in a little more detail as my presentation continues.

Again, typical elements are high insulation levels in the attic and walls, and fully insulated in the basement; high-efficiency heating systems such as heat pumps or high-efficiency furnaces.

Attention to detail is really one of the key aspects of an R-2000 house which I think would be very difficult to legislate. There has to be the commitment to delivering a quality product, brought on by the voluntary compliance to the R-2000 standard.

Typically, what you would see if we do not deliver airtightness is the potential for moisture to get into the structure or the potential for condensation on windows and so on. You may be familiar with problems like that. It is wholly a

ınction of the types of things we are trying to eliver better in an R-2000 home, a high-quality ome.

This is the element I spoke of: a controlled entilation system. This one incorporates heat ecovery for maximum comfort of the occupants nd a controlled level of fresh air introduced into ie building continuously at all times. We are not t the mercy of Mother Nature; we are introducıg fresh air continuously. What we typically ound in our monitoring is that these houses have ery high levels of indoor air quality and eshness.

The controlled mechanical ventilation system rovides a control over not only indoor air ollutants but also over humidity. As I say, it ıtroduces fresh air into the house. The fact that e incorporate heat recovery into many of them educes the heat loss.

Typically, the intrusion you would see in the ouse is nothing more than a grille in the kitchen nd bathroom area, and we integrate the supply the heating side of the building. It is done in a ıanner which is very compatible with existing onstruction techniques.

One of the features of an R-2000 house I had ot mentioned is south-facing windows. Many of ou who are familiar with the subdivision rocess will realize it is not always possible to eliver south-facing windows. Where that is not vailable, because R-2000 incorporates a perforıance measurement, compensation must be ıade in other aspects of the building design. It is ery comprehensive in that respect.

Mr. Buchan touched on the training and ducation which is part and parcel of the R-2000 rogram. Builders receive two-day and three-day uilder training courses and one-day updates on n annual basis. There are specialty courses for ıspectors, people who review the plans and eople who are involved in testing the houses. or people who install the mechanical ventilation ystem, this has been the driving force behind roducing courses for that industry which was eally in its infancy at the time the R-2000 rogram got under way. It is now seeing much vider usage in all forms of construction.

At the builder training, builders are typically ntroduced to the computer age. If you think of he potential for computerization of most industries, to have builders familiar with this tool is a ery massive step forward. This allows them to ncorporate computer modelling of their designs o optimize the cost and performance of their uilding.

The training and education does not stop in the classroom. It goes out into the field. We have people who deal with the builder one on one as he is building his first few houses. At a time when the house is readily inspectable, we go through with him and point out things that should be paid attention to in the completion of his house.

An R-2000 house is a house that meets the R-2000 technical requirements. They look fairly comprehensive here, touching on all aspects relating to energy and overall construction durability, to delivering an all-around high-quality house.

What we had to incorporate as part of our desire to maintain a high quality in these houses was a quality-assurance process which virtually assured that the initial houses which were built to the standards were, in fact, repeated in subsequent houses–the houses that we are now actively engaged in marketing.

These houses have every plan reviewed at an early stage. They have the design and are computer modelled and approved on that basis so that we know the type of performance we can expect from the house. The house then proceeds to construction and a building envelope is tested. This is a device which is perhaps unfamiliar to many people here, but the building industry is becoming quite familiar with it. It allows us to check for drafts and uncontrolled air leakage which we would like to minimize in R-2000 houses.

Finally, we have a person who is dispatched to every R-2000 house to assure that the house that was submitted in the plan stage is, in fact, the house that is there on site. That gives us the assurance that the house will meet the R-2000 standard.

The benefits of an R-2000 home are perhaps what would impact most on the marketability of this product. Increased comfort is an obvious one. When you control drafts, when you use high levels of insulation and you use efficient heating systems, you get a more comfortable house.

Reduced fuel costs cannot help but happen with the measures that we are taking in these houses. Controlled ventilation is a very powerful benefit that many consumers get. I need only ask the members of the committee: How many of you have relatives and friends who have allergies? This is the first house that is available that allows you to control all air coming into the house. You can filter it, clean it, do whatever you want to give you a comfortable living environment. So it is a very powerful motivator for the buying public. A quiet interior is a less obvious one, but

when you use high-quality windows and high-insulation levels, that too, is delivered.

Of course, you can see from the types of things I have presented here, we are emphasizing quality construction methods. A builder building an R-2000 house aligns himself with a standard which delivers quality construction and makes him a more quality-conscious builder in the eyes of the buying public.

Complete with what we are trying to do to develop our industry, we are trying to give the builder the marketing tools to present this to the buying public. Because it is a voluntary program, we want to make sure that this program delivers marketing benefits and gets more people interested in what we are doing.

So where we had typically, in the early stages, a logo or an identification that looked more government-oriented, I would like to introduce the committee to something they will see more of. This is the industry logo. It will be on all R-2000 publications and on all materials related to R-2000 that are delivered from the industry side of things. It is part and parcel of where we are going.

Mr. Chairman: Thank you, Mr. Duffy.

Mr. Duffy: Could I just wrap up my presentation? What we have displayed here are the elements of R-2000 houses with the reasons the program was structured in the way it was. Part of the mandate that this committee has, I understand, is to investigate how effective this program has been.

I turn over the floor to Don Buchan, in some respects, to tell how things are going on a national basis. I can tell you that from the standpoint of our association we were committed to producing houses identified as R-2000 for the buying public. We are in the early stages of that process, but already the effect, the spinoff benefits are, if you will, that it is estimated that between 12,000 and 20,000 houses nationwide have been built to the standard; that, with somewhere in the neighbourhood of 3,500 houses being identified formally as R-2000 houses, the impetus for identifying houses is growing as the marketability of these houses becomes more well known.

The R-2000 program set as a goal in its early stages to train some 2,000 builders. Already at present, before the program's sunset of funding from the federal government, we have trained 4,000 builders nationwide, so that is a massive impact on our industry. I would hazard a guess that there are very few builders out there who are not aware of R-2000 houses in some respect.

1430

The formal role of registering houses is taking on an even greater significance as we get more industry partners involved in adding to the marketing of these houses, major nationwide corporations such as Fiberglas Canada, Dow Chemical, Lennox corporation. The list goes on and on, and I would speculate that I am not even aware of the breadth of the number of corporations that are involved nationwide and are now committed to promoting R-2000 houses in some way, shape or form.

In Ontario you are no doubt aware that our industry has been contending with a housing boom. We have been operating at peak capacity for the last number of years. That has meant, quite honestly, that builders have not needed a competitive edge to sell houses. What R-2000 is giving them, though, is an outlet to longer-range planning, and it is becoming increasingly present in the marketing strategies for many new builders, particularly those who are dealing with the move-up buyer, the person who has experience with a home and who would like some improved performance out of a home, or with the retiring buyer looking for a smaller home which requires lower levels of maintenance and has a high degree of reliability. So there are strong market segments which are quite interested in this product.

What that allows is for builders to really se R-2000 in a strong position in their overal corporate plan. Many of you may be aware tha the first-time buyer is virtually nonexistent i many centres across Ontario, and R-2000 house cater primarily to the move-up buyer and th empty-nester buyer, as we say. There is potentia for movement into the first-time buyer market a we become better known. And clearly the othe two market segments that I have spoken of are th largest markets in the new housing sector in thi province.

The social benefits of R-2000 houses, I think stem from some of the market research that w have seen. You may or may not be aware th every R-2000 house is estimated to reduce th peak demand for electricity, if it is an electricall heated house, by some three kilowatts. You hav briefing papers and documents before you th speak to the value of saving three kilowatts, but am told by Hydro representatives that this stan to save the province somewhere in the neig bourhood of $6,000 to $9,000 in capital inves ment in generation facilities, so there is a soci benefit there.

The health benefits of the houses themselves re less easy to quantify, but clearly, when you eliver a house with better indoor air quality, iere are health benefits, and that has an impact ur health care system. I would also speculate iat the extra labour and materials that go into iese houses speak strongly for efforts at job reation. Most of the province is at full nployment or very close to it, but that is indeed omething to be considered in your deliberations.

The other factor I would like to emphasize is ie fact that this is a voluntary program and, as ich, has the potential to go far further than egulation–and is in fact going far further than egulation–both in the direct benefits and the oinoff benefits of the program. Clearly, what we ave here is something that has some very owerful impacts on our industry, and that npact will increase with more active involve-ient of various industry players.

I am told that one of the barriers we see to more ctive promotion by Ontario Hydro is the mitation found in the Power Corporation Act. It mits the extent to which Ontario Hydro can get ivolved in demand-side management programs. you consider that for a relatively small sum put owards marketing this type of housing the enefit is a minimum $6,000 to $9,000 saving in apital investment, I suggest to you that there are ery strong social benefits to be gained from romoting R-2000 and giving Ontario Hydro the bility to do so in its mandate.

That being one of the notes we have, the ecommendations of our association to the ommittee are to consider broadening the man-ate of Ontario Hydro under the Power Corpora-on Act; to consider the fact that if Ontario ydro promotes an all-electric R-2000 house, as ome manufacturers might be inclined to do, that ould result in perhaps Hydro getting a bigger iarket share, which could offset any conserva-on efforts. I think part and parcel of promoting -2000 is promoting the generic R-2000 prod-ct, not the all-electric product, to be effective in ie goals this committee has set forward.

On that note, I would like to leave the ommittee in its deliberations. Thank you for iving us the opportunity to present a little verview of the R-2000 program.

Mr. Chairman: Thank you. I believe there re some questions from the committee.

Mrs. Grier: There has been some publicity ist recently about radon and the levels in homes f all kinds. I am wondering if you would omment on R-2000 houses and radon.

Mr. Duffy: Radon has been handled in our monitoring activities in R-2000 and conventional houses. Monitoring being one of the functions carried out on the national level, I think it is appropriate for Mr. Buchan to speak to that issue.

Mr. Buchan: The radon issue has been an issue, along with a number of other indoor air pollutants, that the program has dealt with for 10 years now. The most extensive monitoring of radon in Canada has been done through the R-2000 program. It is, as I say, one of the concerns. The results of that research show that in houses built to this standard, well sealed–which is one of the concerns cropping up in the media recently, that energy-efficient, well-sealed houses may have a larger radon problem–it is not true if the house is appropriately ventilated. One of the key parts of the R-2000 product is the ventilation system supplying adequate fresh indoor air, so we do not have a radon problem in houses built to the R-2000 standard in Canada.

Mrs. Grier: Does the monitoring show that you have less of a radon problem in houses built to R-2000 with adequate ventilation than in the general house population? What does it in fact show?

Mr. Buchan: The research shows that R-2000 houses have a lower level of radon, on average, than conventional new houses. The research in Canada has not been as extensive as the research in the United States. In the US there have been studies which show that new houses tend to be actually better in general than older houses, partly because of the existing quality of the basement structure and various things. It is a soil gas problem. A new house tends to be better than an older house in general on a very broad basis across the continent, but the R-2000 house, with the ventilation system, is a far superior product because of the ventilation when compared to other new houses.

Mr. Duffy: The radon issue is one that is very site-specific also, in all honesty. You may have a particular site that has a high concentration of radon in the soil gases. So what we are talking about here is an issue that I think is related to various locales across Canada, if you will, and is not specific to one type of house. It is specific to where the house is located.

1440

Mrs. Grier: But have we done enough testing in Canada to be able to say that categorically or to know where those locales are?

Mr. Buchan: We will never be able to decide specifically ahead of time whether a house is likely to have a radon problem or not. According to the survey work that has been done, there are areas that are more prone to it, but it is extremely spotty. You can get a house in a subdivision that is several times over the Environmental Protection Agency standard for what is acceptable and you can have the house next door which has a very minimal level well below the standard; it is that site-specific. There are areas that are more prone to it than others.

Mrs. Grier: Okay. We got some survey results all of a sudden which I may have to absorb and then come back at.

I wanted to ask something on another aspect. My amateurish feeling about the whole issue of well-insulated houses is that there has been a lot of push to insulate houses better, but not necessarily to the kinds of standards and criteria of R-2000 and, therefore, not necessarily incorporating the mechanical ventilation. One always goes according to one's own experience, and I built a cottage that is very well insulated, faces south and has passive solar and all the rest of it, but I did not bother with the mechanical ventilation. I suspect that may well be common. We all went through a period of saying, "You had better insulate better; let's change the windows" and all the rest of it, but we have not put in the mechanical ventilation. Is that a problem?

Mr. Buchan: You are very right. There is a large number of houses that are far better insulated than houses were even five years ago and that do not incorporate mechanical ventilation. The program has made inroads in promoting devices like the heat recovery ventilator that was shown in the slides. There were about 15,000 heat recovery ventilators sold and installed in Canada last year. If we look back to 1982, there were effectively none. So we have moved from a position five years ago, six years ago, when the heat recovery ventilator really did not exist, for all intents and purposes, to the point where there were 15,000 installed in Canada last year. It has become a very mature industry.

Mr. Duffy: And a sizeable percentage of the new houses that are built are, in fact, built with ventilation systems roughed in. Part of what we are trying to do as an industry is to emphasize the importance of the professional development of builders, the knowledge that the builder has. Many houses in Canada are, in fact, built by nonbuilders. Part and parcel of projecting the professionalism of the industry is making sure that a house is built by a trained professional who is familiar with these issues, and that is one of the strong points of R-2000.

Mr. Charlton: I have just a couple of very brief questions. You talked in your presentation about 12,000 to 20,000 homes nationwide that have been built to the R-2000 standard. Can you tell me, first, why we have got that kind of variation? Do we really know how many have been built?

Mr. Buchan: The actual number that we track specifically and count are the ones that are registered and actually end up with a home identification certificate. At this point, that is in the 3,500 to 4,000 range. These other houses, the 12,000 to 20,000, are ones that, through an independent diffusion study that has been very recently completed, are determined to have been built to the standard but not registered under the program. So we do not have any direct control, nor do we have any direct mechanism for counting these. Those are the estimates, the low end being about 12,000, the high end being in the 20,000 range at this point.

Mr. Charlton: Okay. Over what period would that have been?

Mr. Buchan: Since about 1982, but the bulk, obviously, in the last two to three years. In the first year of the program, we built about 20 registered R-2000 houses. From there we have grown to the point that if you were projecting–

Mr. Charlton: These are all national figures, are they?

Mr. Buchan: These are national figures.

Mr. Charlton: What would that represent, roughly? I know it is going to vary each year as the programs grow. What kind of average penetration in terms of the total new home construction would it represent at this stage?

Mr. Duffy: Even with the housing boom–and I have illustrated the reasons that would have a negative impact on our ability to present this as a marketing edge–we have managed to take between one quarter and one third of the national figures. They are produced in Ontario every year. At this stage, probably around 35 per cent of the R-2000 houses that are built nationwide are built in Ontario.

Mr. Charlton: What percentage of the new homes that are built in Ontario would that represent?

Mr. Duffy: We are primarily working with the houses that are not multifamily dwellings. These are single-family dwellings, although we are now moving into the multifamily dwellings. It is

part of the technical development of the standard, you must understand. I think this year it was projected that about 35,000 houses would be built in Ontario. There are 80,000 units built in Ontario, so the multis have a very significant impact on what we are doing. We are proceeding in two directions: broadening the base of the standards so that we can effectively deal with more house types, and marketing in the sectors that we are active in.

Mr. Charlton: Roughly, how many single units will we get in Ontario this year, just to compare with the 35,000?

Mr. Duffy: Projections for this year are that approximately 1,500 units will be formally registered. If the numbers that Don has quoted are accurate, we are looking at approximately a five-to-one spinoff benefit of houses built with the standards but not necessarily registered.

Mr. Charlton: Thank you.

Mrs. Sullivan: I wonder if you can comment on the market area that the R-2000 homes are occupying. Is it the high end of the market or is it across the board? Is there an equivalent proportion built, say, at the $300,000 range as at the $120,000 range?

Mr. Duffy: Price tends to be a problem, because factored into price are land costs. If you will allow me to be somewhat general in my comments, I think typically we have been targeting the marketing efforts at the middle of the road and at the high-end product, recognizing the fact that there is very little low-end product that is built in the province. In Ontario, the average new home lot, which would have a 35- to 40-foot frontage, would carry with it a price tag of somewhere in the neighbourhood of $150,000. That is the Toronto-centered region. So land prices are a very major element in what we do.

The question that often comes up about R-2000 is, what is the incremental cost? Typically, it tends to be five per cent of house cost, so what we are talking about is something equivalent to a real estate commission, to put it in layman's terms.

Mrs. Sullivan: Right.

Mr. Buchan: What may be more realistic to look at actually is answering that question on a national basis, because the Ontario housing market at some point will revert to being a more normal market. On a national basis, we are seeing penetration across the board, from the low-end rate to the highest-priced houses you can find in this country. At the low end, we have a number of manufactured-housing people who are getting into the R-2000 program. These are people who build your typical double-wide, ready-to-move house out of a factory. We are seeing this happening on the east cost, and these really are the low-end products as far a price goes. We have managed to make some very big inroads there. The manufacturers are finding that this house is as easy to build as the product they were building in the past, the additional cost being effectively the cost of putting an appropriate ventilation system in and a slightly higher level of insulation in the product.

Mrs. Sullivan: What would be the payback period for savings in fuel costs?

1450

Mr. Buchan: That is a question that cannot be answered, except on a very site-specific basis. It depends very much on the particular location and on what product the particular builder was building before he decided to build R-2000. That is the problem.

Mr. Duffy: The energy consumption is lifestyle-related; so what we normally revert to is projected energy consumption of an average household, if you will. We are looking at savings of approximately 50 per cent on the average energy bill over houses built to the minimum building code. In many cases, it is much higher than that. Often what we find is that the sheer existence of an R-2000 builder selling a more efficient product in his marketplace tends to bias the quality standards of other builders building alongside him, who may not be R-2000, to a much higher level of energy efficiency. This is, again, a spinoff benefit; so the savings you might get from builder A, as opposed to builder B, might not be as great as the numbers I am quoting, but that is over building code minimums and we think the savings are really quite remarkable on that basis.

Mrs. Sullivan: My next question, and this is my last one, relates to the training programs for people in the construction industry. For example, would training in construction of R-2000 houses be included in the curriculum of the programs that are being done in association with Mohawk College? Would it go down that far, I guess is what I am saying, into the construction trades?

Mr. Duffy: Perhaps the overriding objective that we have with the program is an objective we refer to as institutionalization. Part and parcel of what we are doing with institutionalization is we are trying to work R-2000 elements into existing institutions. The educational institutions are an

excellent example. Recently, approximately 20 educational institutions, ranging from community colleges to architecture faculties, have been supplied with what we call the Quality[resource centre, which not only provides R-2000 training elements, but also provides elements from the CMHC builder workshop series, elements from the National Research Council, builders' note series and so on. That material is getting through to the instructors. This spring we held two workshops with community college instructors from across the province–one was in Waterloo–specifically to attack getting R-2000 included in the curricula of these colleges.

On the trades level, we are involved with dealing with the trades program committees, the program advisory committees. In fact, one of the presentations I have to do next week is to the program advisory committee for the carpenters. There is a similar one coming up within a month's time for the programs dealing with the electrical contractors. It is part and parcel of what we are attempting to do, a very broad-based approach.

Mrs. Sullivan: I think it is refreshing that the homebuilders think there is indeed a market advantage in terms of the R-2000 program. We heard from an appliance manufacturer yesterday, who said people did not give a damn about energy efficiency. It is kind of a different point of view. Thank you.

Mr. Passmore: I do not know why it always seems that my questions follow up nicely to Mrs. Sullivan's, because that is the question I was interested in pursuing with you. We have had witnesses appear before us who have indicated that, in their judgement, consumers are no longer particularly interested in energy and in energy savings. I am wondering what your views are on such a sentiment and what impact it might have on consumer demand for R-2000 homes.

Mr. Duffy: There have been national surveys and regional surveys dealing with consumer preference, with factors that influence the buying decision. Naturally enough, when you are talking about a product such as housing, site location ranks very high on the list, as does price. Consistently over the last five years, energy has been in the top five. Most recently, it was rated third in the minds of the buying public in considering the purchase of new houses. Perhaps Mr. Buchan can give a little more enlightenment on what he has seen in the national data.

Mr. Buchan: He has basically said exactly what the data has been showing. People now expect the house to be energy-efficient. It has become an expected thing as opposed to som thing you really look for. They just assume it w be; it is part of what people now expect. It is n number one, obviously. Price and location st are the high ones on the list and they always w be.

Mr. Passmore: What about your trainir program and the builders themselves? I hav heard it said by some of your colleagues that one a builder has been trained in R-2000 techniqu and technology, you would never be able to g him to build anything but an energy-efficie home. In other words, are we building up a stoc of tradesmen who are going to be a long-ter investment?

Mr. Buchan: Very much so. There is n question that the influence of the trainin program has improved the quality of building. think we can get very close to saying now th there is not a house built in Canada that is no somewhat affected by the R-2000 progra because of that training program. People are ju more aware of the issues. One of the hazards o this is that sometimes a little knowledge can b dangerous. We do see examples of people wh do things, who obviously have learned some of but did not learn all of it quite the right way. Th is part of the evolutionary process of changin any industry.

I think the most interesting work which ha been done in this area has really been to look a the uptake of this technology relative to th uptakes of other technologies in the residentia building industry. There have been a number o examples over the last 25 years of fairly majo changes in the industry. The use of drywall ove wet plastering houses took 15 to 20 years t become common; the use of truss roofs instead o stick-framing roofs took 15 to 20 years to becom the common way after it was first developed.

The R-2000 technology has really got to tha level of penetration in the industry in somethin like one third of the time. That is largely becaus of the very concentrated effort of training in th industry. That has been the most successful par and will continue to be the most important an successful part of this program.

Mr. Passmore: Do you have a number on hov many R-2000 builders are trained in Canada?

Mr. Buchan: We have had about 4,00 builders go through the training program. W have had a total of something approachin 10,000 people take the training program, bu there are a lot of other people who get involved These may be people involved with utilities an suppliers and other people.

Mr. Duffy: Building code people who have an -2000 builder in their locale.

Mr. Buchan: We have had builders recently vho have run workshops for their own com- anies.

Mr. Duffy: This is the interesting develop- nent we are seeing now. I am actively involved vith some of the larger builders, and part of what am able to do for those people is deliver training n their own corporate boardrooms to their staff. n that instance, it not only becomes a training xercise aimed at delivering a better-quality ouse, but building a better-quality team to work n the builder's behalf on into the future.

Mr. Chairman: You are obviously represent- ng people who build new houses. Is there any el for the older ones, some kind of retrofit -2000 concept?

Mr. Buchan: The retrofit industry has been ffected by all of this. The people who build new ouses are also the retrofit industry to the greatest egree across Canada. People move back and rth between industries. Many companies deal ith both. That is less common in Toronto than it in the rest of Canada, but generally across anada, the industry is very much the same dustry.

The spinoff effects are there. There is no such ing as an R-2000 retrofit house; we do not gister them and we do not intend to. But the cus we present through the new housing ogram, aiming at a very high standard, does to me degree have the same spinoff in benefits in e retrofit industry. There is no question of that.

Mr. Chairman: But you do not have a sense what could be done or any thoughts, or know anybody developing a type of program that ight be sold to the older housing market, so to eak.

Mr. Buchan: There are a number of programs hich have been promoted through Energy, ines and Resources Canada which have not eveloped to the same degree the R-2000 ogram has, aimed specifically at the retrofit dustry.

Mr. Duffy: If I can be so blunt, the difficulty that you tend to get spinoff benefits from the w house construction industry to the retrofit d of things. Any program targeted to retrofit es not have spinoff benefits in the new. ypically, the new people are either people who e building exclusively new or, as Don says, ilding part of their production as new houses d part as a retrofit.

1500

It is a more diverse group to attack. The renovators as a whole have no national body. They are part and parcel of our association. We have programs that we are working jointly on with people at Canada Mortgage and Housing Corp., for example, to tackle issues related to the renovation of houses. There is a training series that has been well received across Canada–the CMHC builders' workshop series, which we are active in delivering.

That is being broadened to include renovation and retrofit activities, so there is perhaps an opportunity there, but I think the spinoff benefits that you will get in a program targeted specifically for the retrofit market are not as great as what you would get if you are targeting something for the new home market.

Mr. Chairman: Are there any further questions from members of the committee?

Mr. Duffy and Mr. Buchan, I would like to thank you for coming in today and speaking to us and introducing us to the program. I think some of us who may not have seen all of the detail very much appreciate your taking the time to come in and talk to us.

Mr. Duffy: We enjoyed it. I apologize for my cold, but I think you have been highly tolerant in putting up with me today.

Mr. Chairman: I wonder if I could ask our next witnesses to come forward. Our next witnesses are consultants who produced a report, Electricity Conservation Supply Curves for Ontario, which was released by the Ministry of Energy last summer, perhaps even last fall. I believe there is a summary of the report in the documents that have been prepared by the research people. I do not think committee members have a copy of the report. We will try to get you one.

Mr. Kelly and Mr. Torrie are here today to outline this report to us and perhaps update it, although I guess it is so recent it may not need updating.

Mr. Kelly, I am not sure which one of you is really leading the panel. I wonder if you might introduce yourself and the other panellists. Then we can turn the floor over to you to outline this report.

MARBEK RESOURCE CONSULTANTS LTD.

TORRIE SMITH AND ASSOCIATES

Mr. Kelly: My name is Brian Kelly. I am president of Marbek Resources Consultants,

which is an Ottawa-based company specializing in energy management and, in particular, electricity energy management issues. My colleague with me today is Ralph Torrie.

Mr. Chairman: I believe copies of the slides have just been handed out to committee members if they would like to follow along.

Mr. Torrie: As Brian said, I am Ralph Torrie from Torrie Smith and Associates. I work very closely with Marbek on this type of work.

We have appeared before previous incarnations of this committee going back to 1976, so I am a bit of an energy committee hack. Keep trying until you get it right, I guess, is a good philosophy.

Brian and I are going to go back and forth a bit. I wanted to start very quickly by putting energy use and electricity use in particular in its context in Ontario because it is amazing how often, because of all the attention on the electricity issue, we lose sight of its relative contribution to the other fuels. Are we going to be able to–

Mr. Chairman: You are going to have to move closer to the mike.

Mr. Torrie: I am sure you have seen this until you are sick to death; so we will just run through it quickly. This first slide basically shows the final demand for energy in Ontario broken down by the various sectors as we normally think of them: the commercial sector comprising everything from retail stores to office buildings to institutions and schools; the residential sector is obvious; the transportation sector is mostly cars but trucks are a very significant portion of that, and then there are smaller portions due to planes, trains and so on; and then the industrial sector, which is the largest sector and which is the energy that is directly involved in the production of our industrial output.

The next slide breaks it down in another way, which is quite familiar, which is by fuel. Because this is final demand, the coal it shows there is just the coal actually used as coal at the point of final end use; so it is only nine per cent. If you were to put up, for example, a slide of primary energy and showed all the coal burned to produce the share of electricity which coal provides, then coal's share jumps; I think it doubles at least. A new sliver develops for nuclear heat as well when you do that, but if you are just looking at final demand, as this slide is, you can see that by far the largest contributions are gas and oil.

The reason, by the way, the numbers are for 1985 is not because we did not have more recent numbers but because so much of the analysis in a few minutes relates to 1985. We thought w would just keep everything in that one year.

These relative portions really do not chan very much or very quickly over time. They change, but not very much over a period of tw years. You see electricity providing 18 per ce of the total final demand for energy in t province.

The next slide just takes a bit closer look where that 18 per cent comes from. That is wh the smaller pie shows: the sources of generati for that 18 per cent which electricity contribut to total final demand. There, you can see in 19 nuclear providing 48 per cent, hydro 32 per ce and fossil, which is mostly coal, 20 per cent. A say, if you showed the fossil energy that w necessary to generate that electricity, the c slice in the large pie would get much larger, b we are focusing on final demand here.

The way we at Marbek Resource Consulta Ltd. look at energy, and, I guess, in t community of analysts we work in who ha been developing end-use approaches to ener analysis prefer to look at energy, however, illustrated by the next slide. This is starting become fairly well accepted, but it is not so ve long. As a matter of fact, to present this kind way of looking at energy the first time I came the select committee on energy in 1976 w actually considered quite radical.

In fact, it is scientifically a very sound way look at the way energy is used, because wha does is probe beneath the commodity market fuels and electricity and looks at what is really fundamental thing creating that commod demand, because the demand for electricity, li the demand for all fuels, is a derived demand very complex demand driven by a much m fundamental demand for some energy serv which that commodity, that fuel or electrici can provide.

I state this as if I am trying to convince yo think it is starting to become accepted, but I s take on a bit of a preaching tone when I make t point because, as I said, it was not so long a that this was just a totally unusual way approaching energy analysis, but it yields v large benefits, as we will see in a few minut

What we see in this slide is a breakdo which is the same final demand for energy looked at in the previous slides, but this time are looking at categories of end use, and these very broad categories. If you are actually do detailed analysis in this field, you can have m more categories than just these four, but purposes of starting to think about energy fr

end-use point of view, this is sufficient and it quite interesting. Notice, for example, that ll over half of our final demand for energy, 58 cent, is heat. Thirteen per cent is what we call essary electric; that is, applications for which ctricity is the only fuel. Electronics is an vious example; lighting is another; home pliances, strictly speaking, can be run by gas, we call them necessary electric for the sake of ument in this analysis. All of that adds up to ly 13 per cent.

10

There is an interesting test. Try it some time en you are back in your constituencies. Ask nebody what percentage he would guess essary electric applications comprise of our al demand for energy, and I guarantee the mbers that will come back will be 30, 40, 50 cent. I do not know what that means except t it is interesting to me that electricity is quite a al contribution to our final demand for energy, it is not a very large one.

The significance of this will come out again en we look at some of the supply curves we ve been developing, because electricity as a nmodity basically has two quite different es of markets. It has this one and it will always ve this one. It is captive. All of the necessary ctric end uses are always going to be provided electricity. I am sure there are exceptions to t since I have stated it in such a final tone but, erally speaking, it is true. Lights are going to electric for a long time to come and so are tors.

Then we have the heat market. There it has ficulty penetrating because of the costs of ctricity per unit of heat. Obviously, the cost of ctricity per unit of electricity is quite competi-e with other fuels. It provides the necessary ctric portion of the final demand, basically, at y price, but when it has to start getting into the at market, it is up against very stiff competition m gas and oil.

Of course, in the liquid fuel section of the end , which is that 30 per cent sliver, which is stly transportation but includes some industri- liquid fuel as well, there is a long-term tential for electric cars to start moving in there, t historically, electricity's share of that market been pretty well zero. The Toronto Transit mmission is about it for Ontario in terms of the tribution of electricity to transportation.

I may come back to this slide again later on cause it is the basis of the approach we take in s type of analysis.

I suppose one interesting thing to notice, as Brian has just reminded me, is that electricity's share of final demand, which you saw on a previous slide, at 18 per cent is higher than necessary electric share of end use, which is 13 per cent. That is because electricity does provide some heat. It is not just providing necessary electric. That actually is illustrated in quite a bit more detail in the next few slides.

These slides go through the sectors showing the way electricity in each sector, residential, commercial and industrial, is divided among various end uses. In the first one, we go into a little bit more detail. For example, here you see that of the electricity consumed by the residential sector in Ontario in 1985, about 22 per cent is heat. If you count space heating and water heating, about 45 per cent of that electricity is heat, and a little over half is what we would classify as necessary electric, the appliances and the space-cooling applications.

Electricity's penetration into the heat market is larger in this sector than for any other sector, as you can see, for example, in the next slide, where we move to commercial electricity use. Here the total heat share is only 16 per cent. That may be a high estimate, but it is within a point or two of being right on. The lion's share of the electricity in this sector is going to lights and auxiliary, which just means motors and all sorts of electrical equipment from computers to fax machines to whatever. Then there is a smaller portion for cooling equipment, which we also consider to be necessary electric in this sector.

In the industrial sector, electricity's share of heat is the smallest of all. It is part of that black sliver called process; it is not all of it. Fully 75 per cent of the electricity used in this sector is for motors. If you count lighting and refrigeration, the necessary electric portion is at least, as a bare minimum, 85 per cent of electricity used in industry. So you see, there is a trend from the residential to the commercial to the industrial sector for electricity use to be restricted increasingly to the necessary electric applications. At least, there has been until now.

The final slide in this series just shows the average for all of our final use of electricity. Here you see that 75 per cent of the electricity in the province is being used in what we call necessary electric applications, which is that 13 per cent sliver of that end-use pie we had up earlier, and 25 per cent is being applied to heat applications.

This whole series of slides really is by way of setting the stage for the way that we approach the question of analysing opportunities for energy.

Basically, when you start to take this end-use approach, when you start to take this thermodynamic approach, when you start to look at the final fundamental demand being not for electricity but for the services it provides, then a whole array of alternatives that you would not consider if you were focused just on electricity as a commodity comes into play. Technological innovation becomes just as valid a way of meeting a given incremental need for electricity service as does another generating station.

I am going to come back and develop this and show how we did the report, but first I think we are going to stop and Mr. Kelly is going to describe in a bit more detail one particular example of the way that more efficient technology can supplant the need for additional generating capacity by providing incremental needs for electricity services more cheaply and more efficiently than additional generating capacity.

Mr. Kelly: The study that I want to sample for you–I am by no means going to take you through it, and I am going to try to pick out only the items that are relevant to the line of argument that we are developing here–is a study we did about two years ago for the Department of Energy, Mines and Resources on the type of lighting that you see overhead here, office fluorescent lighting.

What we did was to look at the lamps, the ballasts and the reflectors. The first two tables show you what we call several generations of fluorescent lamps.

Mr. Torrie alluded to the concept that we have new technologies, technological innovation coming along. For many, many years, the fluorescent lamp was a static technology–a four-foot fluorescent lamp consumes 40 watts of power– but beginning in the late 1970s, in response to the energy crisis, manufacturers developed more efficient lamps. I do not propose to go through this in a lot of detail, but we have here four generations of technical innovation in four-foot fluorescent lamps.

We have the first series, which we call 1A to 1C, and I contrast these to the so-called conventional lamp consuming 40 watts of electricity. So we have a series of 34-watt lamps on the market. There are brand names there. There are numbers showing you that they consume 34 watts rather than 40 watts. There is a total saving of seven watts per lamp. You may say, "Kelly cannot subtract; it is only six," but there is an additional saving in the ballast system, and I am going to try to identify these synergies as we go through.

Those lamps provide slightly less lum output–a lumen is the measurement of lig output–but they are, at the same time, mo efficient. They cost about 44 cents for the fi generation, the differential price between 34-watt and 40-watt lamp. The annual saving about $1.12, based on the assumption that t average office lamp burns for 4,000 hours a they were paying, two years ago, about fo cents per kilowatt-hour. That produces a payba period of about five months or 0.4 years.

1520

I am going to come back to this theme, but y wonder why any public sector manager or sha private sector manager would not be buying the technologies up as fast he could get his hands them and installing them in his building if th produce a payback in five months. I will con back to some numbers on the actual mark penetration.

The next table, table 2, looks at furth developments. We have the second generation lamp, which lowers the consumption further, 32 watts, a total saving of nine watts. They are little more expensive, the saving is a little highe the payback period is about 1.4 years. Similarl through another generation, the third generati of high-energy-saving, new installation lamps say "new installation" because it is particular applicable; they require new ballasts a luminaires–there is a payback period of abo 2.9 years.

Then there is a line of what we call premiu quality lamps that are available in both 40 wa and an economy version of 34 watts. If you lo at the lumen output, initial lumens, they ha very high outputs. These are designed especial for new applications where you put in a mo widely spaced grid of overhead lights. You ha fewer lights, fewer ballasts, fewer luminaires produce the required amount of light and the are energy savings inherent in that.

If you will flip over to table 3, we go throu ballasts. You might ask, is that not somethi you put in the bottom of a ship to stop it fro rolling over? That is what I thought before I d this study too. A ballast is basically a piece simple or somewhat more complicated electri equipment that starts a fluorescent lamp a maintains the proper current characteristics for

Most of our ballasts are what we call standa core-and-coil ballasts, including two norn lamps. They consume about 96 watts. There three generations of energy-efficient ballasts the market. There is the energy-efficient ball which has copper in the coil instead of alumin

high-grade steel instead of low-grade iron in coil. That produces, if you look at system :tricity savings, about 10 per cent. Every time ı install one of these ballasts, there is about a ɔer cent saving, for an annual dollar saving of ut $1.60. The price differential is about $6 or ıyback period of about 3.8 years.

'here is on the market, particularly in the ted States, a series of ballasts known as :tronic ballasts. Rather than using core-and-l, these use transistors and electronic compo-ts. They are solid-state circuit pieces of ipment, in other words. They produce some-at higher savings in themselves, but they ɔ–and I would draw your attention to systems ings of electricity–produce synergistic sav-s in the lamp as well. I will not get into the sons here, but you can have savings in the ge of 15 to 40 per cent when you hook up an :tronic ballast with a lamp that is capable of efiting from the characteristics that ballast generate.

Also, if you go to the dimming-type electronic last, you can hook that up to a photoelectric and dim the lights in this building to take ount of the amount of light coming in those ıer large, west-facing windows from which are now experiencing light and heat gain. h those types of ballasts and the right circuitry lace, you can achieve savings of 50 to 80 per t, because you can cut back on the draw of the ıps during the daytime to account for day iting.

'he last technology I want to review is what is ed optical reflectors. Most fluorescent ectors–and probably the ones overhead, if I ld see through the grills–have a white-painted tal backing, intended to reflect some of the ıt downward, but not an awful lot of it comes vn. The diagram up on the screen, which is in your pack, shows generally what happens ı standard troffer or luminaire and then what pens when it is fitted with a type of highly ective material that is bent into a certain pe, as you see illustrated, to make maximum of the light, to direct the light that is often , bouncing around up on the reflector, down he work surface where it is intended.

'here are basically two generations of this ınology: the polished anodized aluminum and silver film. The concept here, among others, ıat you take a fixture that has four lamps, you one of the these reflectors in and you take out of the lamps and one of the ballasts if there two ballasts in place. You basically cut your sumption by 50 per cent and you end up with somewhere between 85 and 95 per cent of the light that you formerly had at the work surface with only half of the electricity consumption. The payback periods for these technologies are 2.6 and 3.6 years respectively.

I have dealt with three discrete technologies: lamps, ballasts and reflectors. These are all packaged together in units that you see over your head. The next table, which I will not spend a lot of time on, just shows you nine possible combinations of these technologies and how you can have some rather impressive synergistic effects.

Our base case here is conventional lamps and standard ballasts. If you put in the first-generation energy-saving lamps that we talked about earlier, you can have percentage savings of about 14.6 per cent or about $4.49 for a four-lamp fixture.

However, if you go through various combinations of second-, third- and fourth-generation lamps, second- and third-generation ballasts and second- and third-generation reflectors, by the time you get to the bottom of this table–example 9–you have savings, depending on the amount of day lighting that you assume, of somewhere between 56 and 90 per cent in electricity consumption, for virtually the same amount of light received at the desk surface.

All I want to point out here is that we have a range of potential savings from somewhere in the neighbourhood of 10 to 15 per cent up to a potential saving in the neighbourhood of 80 to 90 per cent. There are payback calculations that go along with these nine different combinations. I will not go into that.

The next table summarizes the conclusions of this study. The same equipment generations are there, as well as the payback periods. The numbers I would like you to note are the ones on the right-hand side. Despite the very attractive payback periods of the lamps, the market share of energy-efficient lamps in 1985 was 23 per cent. That is, of all the lamps sold in 1985, 23 per cent of them were energy efficient.

How is that for an item with a payback period of about a half a year, that only one quarter of the people are buying them? When you look at the degree to which that technology has penetrated the stock–that is the stock of buildings we have out there because of the lag time involved–it is about 15 per cent. When you look at ballasts and optical reflectors, there is virtually no penetration in Canada of these technologies.

In the last couple of illustrations I want to show you, we developed some market penetration modelling.

There are three scenarios here. There is status quo, where there is no intervention by Ontario Hydro or government into the marketplace. As you can see, in 1985 there was about a 20 per cent to 23 per cent share of the market. We figured that there should be pressures that would cause that to go up as the status quo line shows you.

If, however, government and/or utilities were to intervene with information and incentives to help pay for the higher first cost of these technologies, you can see a much more rapid uptake so that by the early or late 1990s, depending on your scenario, we could reach almost total market share for the energy-saving lamps. This graph is only for lamps. We did not do similar analyses for ballasts and reflectors because they are virtually nonexistent in the market.

I want to refer to one other technology that you may have heard of. It is compact fluorescent. I happen to have one here. It is small enough that I can carry it around in my pocket. That is why it is called compact. This technology is designed to replace an incandescent lamp, the sort of lamp you see in the chandelier or the one that is in your table lamp at home.

This replaces an incandescent that is rated at six times its wattage. In other words, this one is nine watts. This would replace close to a 60-watt incandescent lamp. It cuts electricity consumption by 80 per cent. It lasts 10 times as long as the incandescent lamp it is replacing. The colour is just as good, if not better, in terms of not being yellow or not being blue. In buildings where there is tooling going on, it cuts heat production by a similar 80 per cent. I am going to come back and refer to this later, but it is one of the more portable pieces of the technology. We did not have the nerve to carry four-foot lamps on the airplane today.

1530

In closing, I want to refer to the market barriers that were identified in this study. Probably the most important is the higher first cost for the energy-saving lighting technologies. A very definite one is the split incentive in rented or leased space. So much of the office market in many of the other commercial ones is leased or rented space, where the person who would pay for the lamps does not benefit from the reduction in the electricity bill and therefore you have this split problem.

There is a general lack of financial sophistication on the part of building owners and managers to identify the potential for these savings; a lot of ignorance of the potential savings, a lot of force of habit. We still find tendering contracts even government departments that when they go ou buy lamps, the prime criterion is least first co "We are not interested in whether it saves us additional cost within five months. We want le first cost." That is just a force-of-habit a institutional barrier.

In summarizing, in regard to the fluoresc lighting example that we have tried to develop you–and it is only one of many–we would there is very large technical and econor potential for energy-saving lamps. If you reme ber back to the pie chart that Mr. Torrie show you of the commercial sector, 40 per cent electricity consumption was in lights. We ob ously have the technologies to save a la portion of that. They are quite economic in ma applications. Some are borderline, and we come back and talk about that.

There are mature technologies. Any bugs t may have been in the first brands are worked o There are no essential technical problems w these pieces of equipment. However, they are penetrating the market due to the barriers that saw earlier.

Our position is that incentives, probably in form of rebates, would greatly increase market penetration, and our modelling shown that to be the case. We have also show the study that this is a very cost-effective opt for Ontario Hydro, which can buy electricity, buy power capacity at much lower cost, ab one tenth the cost, through paying the increm tal cost of energy-efficient lighting than it through building new generating stations.

On that note, I will ask Ralph to talk ab supply curves.

Mr. Torrie: I thought we were going to hav quiz on lights first.

We are not really presenting all this techni information–and even that is fairly superfic what we have said about lights–because we th it is important for politicians to understand about fluorescent lights in order to decide wha do with Ontario Hydro, but rather because th is a tendency from time to time in this discuss for an impression to develop that someh while the power plant options are real tangible and available and we know the costs we know the risks and we know how long it take and how much they will provide, whe comes to these other technologies, they somehow less well developed or less real. I just actually not the case. These technolog especially the one that Mr. Kelly has b describing, are quite well developed.

The report you referred to at the beginning of e session, Mr. Chairman, is the one whose title ge is on the slide projector now. This was work at was done for the Ontario Ministry of Energy, hich has been trying to develop an independent pability to assess the potential for electricity nservation; independent, that is, from Ontario ydro. This is only one of a number of initiatives at have been taken within the ministry in that rection.

I wanted to introduce it in that context because hink that the development of such an indepennt potential, whether it takes place within the inistry or whether it takes place within some her centre of excellence within the province, is ry critical in the years ahead to the developent of electricity efficiency technologies and arkets in Ontario.

It would be quite easy and quite possible, and is not an altogether unlikely scenario, that ntario Hydro will completely dominate this ctor, and committees in years ahead will have e same problem with information in this field as u have about nuclear power today: that there is ly one source of information. I guess I n–before getting into describing this report a –making a pitch for the importance of dependent and outside expertise on some of ese subjects.

What we did in this study is basically defined this graph. The electricity conservation pply curve is just a tool for making an equitable d symmetrical comparison of the cost and pact of technologies for improving the effincy of electricity use with the cost and the pacts of technologies for generating ectricity.

You look at investments in various types of ectricity efficiency improvement; you amortize em over the lifetime of the technology in the me way Ontario Hydro amortizes the cost of a w power plant over its expected lifetime; you vide that amortized cost by the savings that chnology achieves in kilowatt-hours, and you d up with a cost per kilowatt-hour for that rticular measure.

In consideration of the time and the lateness in e week and the hour, I am not going to work rough this, but I want you to have at least for e record one example, and if you want more, u can read the report until you fall asleep.

Just to show you the kind of detail that goes on this work, this is the way that one would lculate, for example, a block on the electricity nservation supply curve that would describe e savings and the cost of implementing what we call level one fluorescent lighting improvement in large fuel-heated office buildings.

The base technology is the standard four-foot lamp fixture that is ubiquitous in the office building sector. The level one improvement is simply replacing the bulbs with 32-watt efficient bulbs and the ballast with a 10-watt core-efficient ballast. Nothing radical, and the costs are there. They are annualized out per fixture.

The reason you have to specify the type of building is because the lights are on for different numbers of hours in different types of buildings. They happen to be on for, we think, about 5,200 hours per year in large office buildings. The cost then of electricity saved simply becomes the percentage saving times the total floor area of fuel-heated, large office buildings.

You divide that by the amortized cost and you end up with a potential for saving, just through this measure alone in this type of building in Ontario–in 1985, because in this case we are just analysing the base energy consumption in the year 1985. That perhaps is not made clear enough in this particular slide. You come up with a total of 690 gigawatt-hours of potential savings at initially–well, actually, you come up with 611 gigawatt-hours of savings at 0.9 cents per kilowatt-hour.

It is a lot of electricity at a very cheap price. It gets cheaper because you have to add to that the electricity that you save as a result of the fact that air-conditioning loads in large office buildings tend to go down when you implement efficiency measures in the lighting system, because air-conditioners in large buildings spend a great deal of their time removing the heat that the lights are generating. You get into these spinoffs and secondary effects.

The net effect then of this measure becomes 690 gigawatt-hours of saved electricity at 0.8 cents per kilowatt-hour, and that becomes a block in a supply curve. It is an amount of energy that can be delivered, 690 gigawatt-hours; a large amount of energy at 0.8 cents per kilowatt-hour.

This then is the supply curve that we developed for the entire commercial sector. You see a very large block nearer the lower left-hand side of the curve called "Level One Lighting." You will notice that it is not 0.8 cents; it is one cent. The reason is that we did over 100 of these blocks and there were too many to fit on the curve, so we amalgamated all the level one lighting measures for different types of buildings and took a weighted average.

1540

You can see that there are, sitting there, approximately 2,600 or 2,700 gigawatt-hours of savings potential at about one cent per kilowatt-hour. Some of it is at 0.8 and some if it is at 1.1 or 1.2, but it is all clustered around the one-cent-per-kilowatt-hour measure. Every one of these other blocks was calculated in exactly the same way. I am not going to tell you what all the details are except to say that this is the same curve that the technical advisory committee showed you earlier this week. We are the people who put it together. That is how it is done.

The next slide shows you the same thing in less detail because the information is poorer. For the industrial sector, our information is not as good. This curve is probably conservative because of that, but it is also probably inaccurate in some areas.

For the next curve, the residential sector, I have much more confidence in the data that generated these numbers. You can see, for example, a very large block there in the middle. That is the famous energy-efficient refrigerator case. Keep in mind then that all these blocks are being calculated according to what we felt the total theoretical potential in the 1985 base stock was for saving electricity at these different cents-per-kilowatt-hour rates.

We made no attempt to analyse in this study the potential conservation savings in future years. It is a much more difficult problem. I will describe a little bit more about that in a minute. We were not trying to come up with the last word on the potential for electricity conservation in the 1985 electricity base of the province. What we were really trying to do was develop this tool to see if we could do it and see if we could come up with a useful way of looking at energy conservation options. We succeeded in that.

The final curve, which is in the package of material, shows all of those blocks put together into one composite curve for electricity conservation in Ontario. You can see that if you went all the way up to about five cents per kilowatt-hour, you would get up into the 26,000-gigawatt-hour range, which is in the neighbourhood of 25 per cent of the total electricity used in Ontario in 1985. The breakdown is shown on this side as well, among the different sectors. What it really reveals, as I think Mr. Kelly came to at the end of his last set of slides, was a failure of the market to really allocate resources efficiently.

There is a tremendous amount of technical and economic potential for electricity efficiency improvement which is not being realized. Much of it is what Ontario Hydro calls natural and thinks is just going to happen without any kin extra effort beyond a bit of information. The is, and we are going to get into this more in last little bit of our presentation here, that th are barriers to all of this stuff, regardless o price. If it were not the case, then many of th lower blocks would have been implemen years ago.

If you look at the next slide–I am sure have also seen this, probably on day one of y proceedings, although this is my own rendi of it–this basically just shows Ontario Hyd forecast. The top line shows what they call frozen efficiency forecast. The difference tween the two is what they call natural conse tion. They do not really know what it is, but t are hoping it happens.

The reason is obvious when you look at next slide, which shows the composition of makeup of electricity production in this provi according to the basic forecast. This does even have the frozen efficiency added on top, you can see throughout the 1990s, and especi in the later half of the 1990s, fairly strong gro in the use of coal in this province; even stron in fact, if the frozen efficiency forecast wer come true. There are lots of reasons to belie will not, but if it were to, then the consumption figures would be even hig Already they have trouble, even in the b forecast, in meeting the acid gas emis standards that have been set out without expensive programs for remedial action.

What we are in the midst of doing we hope have done before today, but alas, it is a rese project and develops its own rhythm and take own turn. Our client is sitting behind me. W we have been asked to do, largely because o prospect of very large increases in the coal in this province in the next 10 years, is to tr take this conservation supply curve tool, ext it to the year 2000 and come up with su functions for electricity conservation in the 2000. You may already have seen the diffic in doing this.

The problem is, compared to what? It is thing to take a look at the actual 1985 electri consumption in the province and calculate could have been saved if all of the options appear to be economic and technically feas were implemented. But in order to do that future year, you have to have a base assumption of what the demand is going to What we are using for purposes of this analys the Ontario Hydro frozen efficiency forecast. are not capable, in the end-use approach

ling the difference between natural and strate- conservation.

Frankly, I do not totally understand it and I do t find it a useful concept. We are trying to say t if there were no efficiency improvements m today to the year 2000, and if the demand electrical services increased according to tario Hydro's basic economic forecast, and if ctricity captures these extremely large market ares, which are in their basic forecast–I do not ow if you have got into this, but there are very ge penetrations of electricity into the heat rket in the basic forecast.

In fact, in the commercial sector–I did an periment just the other day–if you freeze the iciencies, the forecast of electricity for the nmercial sector goes from 49 units to 52 units, nething like that. If you let the efficiencies at the way they do in Hydro's forecast and eze the market penetrations at their current els, the forecast drops from 49 units in the ar 2000 to about 43 units.

The market penetration impact in that basic ecast of Ontario Hydro, the increased share– d this is not increase in electricity for necessary ctric applications; this is increased shares of ctricity into the space-heating market in the ail sector, increased shares of electricity into space-heating market throughout the com- rcial and institutional sector, increases of ctricity share of industrial heat, large in- ases im auxiliary electric heating in the idential sector, people going out and getting seboard heaters, phenomenal growth.

If all of that happens, then you end up with a seline against which we are doing our new nservation analysis. We are convinced al- ıdy, from the preliminary results, that conser- tion and efficiency improvements are really key to the whole strategy for the development the electricity sector in this province. They ve to be for the next 10 years. The level of mmitment we see from Ontario Hydro and the el of leadership we see from the government not yet match what is going to have to be done order to achieve the level of energy security it we have grown accustomed to in this ovince.

We need to do it for environmental reasons, need to do it for economic reasons and we ed to do it for energy security reasons. We nk that now is the time for really aggressive dership in this field, because if we wait, every ar we wait, every year we have to change our seline, from 1985 to 1986 to 1987, we are eing a whole other year of potentially more efficient electrical using devices go down the drain for want of good standards and a well developed and managed electricity efficiency industry in Ontario.

1550

We want to spend the last few minutes of our prepared remarks–and we hope to be finished, I think, in about another 10 minutes or so. I should not do that to you, Brian. I should say that I am more or less finished and how long we take now really depends on Brian, but we are going to spend the last few minutes of our prepared remarks discussing what we see as some of the barriers that need to be overcome if we are going to achieve this potential.

Mr. Kelly: Generally when we talk about barriers, we talk about market barriers. We should have pointed out we have brought copies of the complete text of the studies we have done, to which we are referring today. We usually focus on identifying the market barriers. I would like to talk about those, but I want to go on to talk about what we term infrastructure barriers and Ontario Hydro or institutional and government barriers.

There is a case I want to use, if I am able to find my place here. The types of market barriers–Ralph, if you could put the next one up–are those that I think you probably are quite familiar with, and probably previous witnesses have cited to you. There is information and awareness; there is the first cost of the more efficient technologies; there is a certain amount of confusion in the marketplace as to what is efficient and what is not, what is reliable and what is not. There is a certain risk aversion; people are averse to taking technical risks with new pieces of equipment that they perceive have not been proven. There are the split incentives in leased and rented space; there is the question of warranties and quality assurance on new products, home renovations, etc. We could go on and enumerate this list even further.

I wanted to illustrate it briefly by reference to another study on electric motors. Keep in mind the very large shares that we saw earlier of electric motors in commercial and industrial markets; basically 75 per cent in the industrial market and between 40 and 50 per cent in the commercial market. The electric motor is an already relatively efficient piece of technology, but that is not to say it cannot be made more efficient, and the next curve or diagram in your package shows what are called–let me back up a bit–two levels of efficiency of motors. Across the bottom you have horsepower, from one to

200 horsepower, and up the side you have percentage efficiency in turning electrical energy into shaft power.

The bottom curve shows that generally motors increase in efficiency as they increase in size; that is just a function of what goes on inside them. But it also shows, when you refer to the little triangles, that there is a whole range of standard efficiency motors on the market. There are also, for virtually every size range, a high-efficiency motor, defined by the boxes and the curve drawn through the boxes. In the middle, the Xs show what we have called the "utility definition." In an attempt to define what is a high-efficiency motor and what is not, Ontario Hydro and British Columbia Hydro have drawn a line in between, which is the middle one, attempting to differentiate between those products. I am going to come back and identify that as a problem.

So we have a very large amount of electricity consumed and a relatively small increment in efficiency improvements, but it still seems to be quite worth while. The next table shows you by motor horsepower size what is the payback to the consumer in investing in a high-efficiency motor as opposed to a conventional-efficiency motor. The reason that we have two curves, commercial and industrial, is that the duty factors, the number of hours per year that a motor runs, tends to be a lot higher in industry because you are in two and three-shift industries as opposed to a commercial building where fans and cooling equipment and so forth may only operate part of the day. So you can see payback periods that range from a high of 5.4 years at one extreme of commercial down to about 1.8 years for industrial. This is the payback period that it takes for the end user to regain his incremental investment in a high-efficiency motor as opposed to a conventional one.

Let's look at the next chart which shows not only from the user perspective, which is across the bottom there. Those are the same payback periods grouped a little bit according to motor size categories that you saw in the previous one, but in this case I want to focus on the middle band of this table because it shows from the utility perspective what is the cost effectiveness if the utility invested in the total incremental cost of high-efficiency versus standard-efficiency motors. You can see, if you look at something called supply price, dollars per gigajoule, or we could convert that to cents per kilowatt-hour, that the utility can buy electricity at somewhere between \$3.11 and \$6.42 per gigajoule, whereas to produce the same amount of energy from any conventional source, the standard number th used is \$13.50. If we look at saved power, th capacity kilowatts, it is an even more impres situation. For a price that ranges from a lo \$200 to a high of \$395 per kilowatt, a utility buy capacity. To build a new kilowatt of capa costs a minimum of \$2,000, so we have advantage of between 5 to 1, and 10 to 1 in price of conserved power versus new po production.

The next table or diagram shows the impa an incentive to address part of that increme cost on the market. By the way, I should currently five per cent of the electric mo bought in this country each year are efficiency. That is the extent of penetration the annual market of motor sales, five per c That is reflected by the lower graph on this This is the modelling of market penetration you saw previously developed for lighting. is for a certain size range, a 26- to horsepower motor. You can see, we feel, it be very low, increasing only marginally bet now and the beginning of the next centu however, different incentive packages applied to bring that payback period down the two to four year range–which is over industry hurdle rates of two years–if an ince were applied by the utility to bring it down i one to two year payback period, you can dramatic takeoff in the market penetratio high efficiency motors.

However, as the next diagram shows, the a whole host of barriers in this marketplace. this motor example to illustrate, not totall fairly well, the market barriers. They are a the top. We have a higher cost for high effici motors. We have misconceptions in the ma place. A large number of the end users th interviewed regarded high efficiency motor confangled new technology that was not reli That is a misconception because basicall way you get efficiency in a motor is to bu better. You put in better materials. You d something with closer tolerances. It is a reliable motor. It runs cooler. It will not bu as rapidly. They have a longer lifetime. But are misconceptions out there in the market There is a lack of awareness of the econ benefits.

There is a large problem in that there consistent definition of high efficiency. motor manufacturer in Canada has a li motors which he calls high efficienc manufacturer A's high-efficiency motor m fact be less efficient than manufacture

dard motor because there are no rules and ılations that say all motors must be tested to same standard and this is the line that defines ı from low efficiency. So needless to say, we ıld not be surprised that the poor consumer there, even if he or she wants a high-ciency motor, has a dickens of a time figuring ut. There are four different standards of ciency to which the thing can be tested and ı each manufacturer applies his model desig-on indiscriminately. There is a marketing cture which impedes optimum uptake and e is the risk aversion that I referred to. This e attempts to show how these various barriers expressed or felt by various of the stakehold-n this market. I will not spend a lot of time on . If you want to read the study, please do so.

0

'he last page shows some of the measures that ld be taken to remove some of these market iers for electric motors. First of all is a ıdatory testing standard. We have a voluntary ing standard here in Canada; it could be made andatory one. We need a definition of what stitutes a high-efficiency motor. After you e tested it, what is the line that defines low n high? We might consider a minimum ciency standard, that is, you cannot market or a motor below a certain efficiency. Lastly, I ık there is still room for incentives and rebates high efficiency motors. Having a minimum ciency standard and a rebate are not necessar-mutually exclusive items. I will come back to about that when we look at appliances.

.et us move up in the supply chain to talk ut infrastructure barriers for a few moments. do not have a very good set of codes and ıdards in this country. As I have alluded to in motors and as you will see when I talk about ne appliances and heating-cooling equip-nt, we have a weak supply infrastructure in ny cases. The high-efficiency models are de by the same people that make the low ciency models. They are going to sell a unit ardless; there is not a particularly strong entive for them to spend the time educating consumer and selling them a higher-iciency model because there is probably less fit in it for them than on the low-efficiency del that they turn out in large numbers in ich the production line has already been ortized and so forth.

Where you have company A that makes high l low efficiency, we find, in general, in the ıting and the motor's markets, they are not hing them and they are not doing an aggressive job of marketing them. Where you do have aggressive marketing of energy efficient equipment is where you have a company that only makes the high efficiency model. Often this is a small, innovative company that is benefiting from new technology. They go out and they market the dickens out of their product because it is either do or die.

We have problems throughout the industry with proper installation of equipment and maintenance. We do not have, as I have alluded to, the incentives of the supplier to go out and market the high-efficiency models. I would summarize this by saying we do not yet have in place a solid infrastructure or industry that is out promoting and selling energy efficiency in the marketplace. We do not have an energy management industry with which Hydro can develop trade alliances, as we do with the industry that likes to build power plants and transmission lines.

Let us look at one example of what are mostly some infrastructure barriers. This is another study for the Ministry of Energy done over a year and a half ago on appliance efficiency. It is largely compiling information. Among other things, we looked at the potential for future increases in the efficiency of the so-called white goods–refrigerators, freezers, dishwashers and so forth, and the heating-cooling equipment.

This is one example, everybody's favourite: refrigerators and freezers. The line on the left side of the page, the vertical line, shows the current range of consumption in kilowatt-hours per month in 1986 of a two-door 15.5-to 17.9-cubic-foot freezer on top of a refrigerator on the Canadian market. The line going down to the lower right corner is the trend line of efficiency improvements that we see coming out of the United States and out of the research labs of major appliance manufacturers. We have merely looked at the technologies–there is much more detail in the report–and drawn a line which we think is a potential technical efficiency trend line and when we might see these techniques and technologies coming on the market. That is not to say it is going to happen. That is the potential efficiency improvement.

Over on the next chart, I have tried in a different way to show potential improvements in heating-cooling equipment, and here we are talking oil and gas furnaces, room air-conditioners, central air-conditioners and heat pumps. There are efficiency or consumption ratings for these typical, conventional equipment on the Canadian market shown on the first graph. For instance a conventional gas furnace on the

Canadian market has an annual fuel utilization efficiency, called an AFUE, of 60 to 65 per cent.

You will hear me talk in a moment about the new minimum US efficiency standards which require a minimum of 78 per cent in 1990, I believe–I will check that–for gas furnaces on the US market. The state of the art of efficiency–the most efficient type of gas furnace on the US and on the Canadian market because we produce models that are just as efficient as the American–is 95 to 97 per cent. Yet the majority of the sales are still down in the 60 to 65 per cent range.

Similarly, we can look at central air-conditioners, room air-conditioners and other pieces of equipment showing where the conventional equipment is, what the US standard is that is coming into effect and what the state of the art is on the US market and in some cases on the Canadian market. We tend not to have very high efficiency central air-conditioners or room air-conditioners on the Canadian market. After this last summer I would say there should be a premium on those, however.

The next chart is pretty confusing unless I explain it. Think of this as a map of North America. Think of the centre of the page which divides these two bar graphs being the 49th parallel, with Canada at the top and the United States at the bottom. As we go to the left, we have increasing efficiencies. As we go to the right, we have decreasing efficiencies. The numbers there are kilowatt-hours per month.

What this shows is refrigerators of a certain type and size on the Canadian market in 1986 and on the US market in 1986. The height of each bar is the number of models. We cannot get from the manufacturers the actual unit sales of each model, so I cannot provide you with that. This is the number of models on the market.

I want you to basically look at the pattern. We have a Canadian market in that year for that type of refrigerator that ranges between about 73 and 165 kilowatt-hours per month with the majority of the models offered being right in the middle of that range.

On the American market it is all to the left. Their worst refrigerator is the same as our middle-range refrigerator. The bar that you see going through both of them–the vertical bar which is supposed to be hatched, but it has lost a little in the photocopying–is what the 1990 US standard is for refrigerators of that size and that type.

That is in legislation. It is mandatory and the manufacturers in the United States are moving to meet it. So if I showed you this graph for 1990, unless all those lines are in or to the left of th band, they will not be allowed to sell them. O market is considerably less efficient than their

Let's flip over to the next one. It is the ve same graph. You have the very same bars exce what I have done is coded them to show y where the refrigerators are manufactured. So you look at the Canadian market you will see th all of the inefficient refrigerators are Canadi made. The ones that are down at or close to t US standard are imports from the Americ manufacturers. They are the Amanas and t high-efficiency Whirlpool refrigerators that import from the United States.

So the conclusion here is that the refrigerat that our manufacturers are putting on Canadian market are considerably less efficie In 1986 there was not one that even came clos meeting the 1990 US standard.

Mrs. Grier: My puzzlement is because of deputation we had yesterday from the gentlem from Guelph who was manufacturing v efficient appliances.

Mr. Kelly: Freezers. It is a different story freezers. I have shown you refrigerators. I co show you a refrigerator graph that is in the bo We have two small companies in this coun W. C. Wood and General Freezer, which m the most efficient freezers in the world. Tha one success story in appliances–freezers. Ref erators are a totally different story.

Let me conclude this look at appliances by showing you some of the numbers that co from a quick analysis of the 1990 US Natio Appliance Energy Conservation Act.

Interjection.

Mr. Kelly: There are free trade implicati here. You had better believe it. You had be believe there are free trade implications, suc with no other Canadian industry perhaps.

This is a summary drawn from tables desc ing the US appliance efficiency act. It deals some of the appliances. The act covers, I th 12 different products. For instance, lookin refrigerators, our favourite example, across top, the 1984 average consumption was 1 kilowatt-hours. Under the act, which wil effective in 1990, the required minimum refrigerators is 976 kilowatts. The resu average market efficiency for refrigerators be 903. That is a saving of 21 per cent.

1610

Initially you might say, "How come average is better than the minimum?" It is si because what you have done is you

wed, if I can be blunt, all the refrigerators w the line; therefore, the average of those ining is above the line. We have a resulting ige market efficiency because there are more ient products on the market than the standard 13 in this case. You can go through and look ner examples.

hat really is impressive to me is the next , which shows the forecast of energy and r savings that will result from the increases ficiency. You have electricity savings by the 2000. You have energy savings which ide oil and gas products, because this act rs oil and gas furnaces and oil and gas water ers. Those are converted to cost savings by ear 2000 in millions of dollars. I would point hat these are net cost savings. These are the savings in utility bills minus the increased mental costs that the consumers have to pay he more efficient appliances. The bottom is that there is a $28 billion saving that is ected from the application of this act starting year across the United States.

summary, on the next page, we can remove y of the barriers in this appliance market by ing at the infrastructure and putting in place e tough minimum performance standards. I ld like to acknowledge that the government moved and has passed and promulgated an rgy Efficiency Act, a piece of enabling slation which will allow the government to minimum efficiency standards. We await great interest the level of the regulations that be brought forward under that act. It remains e seen whether or not they will be tough.

urthermore, I think there is still room for ntives or rebates for high-efficiency models. ently, British Columbia Hydro pilot-tested a -efficiency refrigerator rebate program, re it published a list of models on the BC ket that met the 1990 US standard. At this it this was only in the Queen Charlotte nds, where they have very high electricity s because it is all oil-generated. You could $75 if you bought a high-efficiency refrigera- from the list, and if you turned in your old , you got a $40 bounty, as we call it, on the p of the inefficient old refrigerator just to ure that you did not put it in the basement and it full of pop and beer. That program arently was wildly successful.

would like to conclude by discussing another el of barrier. There are barriers that apply at Ontario Hydro and government levels. They e to do with laws, with corporate culture, h commitment and with infrastructure. I think one of the most alarming ones is as I understand it, the Power Corporation Act currently makes it illegal for Hydro to offer rebates. This is an item that falls directly in the lap of the Legislature and yourselves. That act requires amendment, because I think and many people in Hydro think that rebates are totally justified and that they are the way to overcome many of these market and institutional barriers we have been talking about. But currently the act forbids Ontario Hydro to give money to consumers.

What they are doing in designing their short-term programs is saying, "What we are going to have to do unless the act is changed is we are going to have to offer"–are you ready for this?–"a forgivable loan." Can you imagine the paperwork involved in negotiating? It is a rebate in disguise, but for legal reasons it has to be disguised as a forgivable loan. The paper burden in negotiating a loan agreement with everybody who wants to put in energy-efficient fluorescent lamps, an energy-efficient motor or an energy-efficient refrigerator is going to be incredible.

Secondly, can you imagine the reaction of private corporations to signing a piece of paper saying that they are taking out a loan, albeit forgivable, from Ontario Hydro? In most corporations I know, it requires a senior executive decision or a board of directors' decision to place a corporation under the obligations of a loan. It means that if some building manager wants to get a rebate to change the lights in a small office, he may have to go to the board of directors because, technically, he is taking out a loan on behalf of the corporation to do that.

To me, this is an absolutely surefire way of killing the potential for demand management programs that Ontario Hydro is planning. It is sort of like the senior management at Hydro and in the government saying: "Okay, troops, we are the generals in the war on energy inefficiency. We want you to take that hill there. It is 4,000 megawatts high. Here's the time we want you to take it in, and here's your ammunition: it's a pea-shooter. By the way, we have your legs hobbled. And what do you mean, you want peas for your pea-shooter?" I do not want to stretch the analogy too much, but I think I make my point.

Also, I think there are what I would term a number of unreasonable tests for what constitutes an acceptable demand management program being applied at Ontario Hydro: effect on revenues; effect on rates; and the so-called no-losers test about which I am sure you have heard. There are also worries about equity considerations between customer classes; if we

give a rebate for fluorescent lighting in the commercial sector, is that not discriminating against the residential sector where we are not offering that rebate?

I think there is also unnecessary concern about how the benefits of demand management programs are going to be split between Ontario Hydro, the bulk power provider and the municipal utilities that distribute it.

There is a hurdle rate being applied–it is sort of a reverse hurdle rate–where analysts in Hydro are saying: "If a technology has a payback period of less than three years, it is economic for the private sector, and we should not be subsidizing it. We should only subsidize things that are over a three-year payback." But our examples of lights and motors show that, despite half-year paybacks, it is not happening in the marketplace. It is unrealistic to establish a principle that we are not going to subsidize something that has less than a three-year payback. It is denying the market realities. It is denying the market failures that are going on out there.

I think in Hydro there is also a failure to recognize the total social benefits of these activities. There is too much concern on the effect on rates, the effect on equity, the effect on revenues, the effect on this corporation, and not enough concern about what is the total customer benefit and the total social benefit from these programs.

I perceive a lack of senior management commitment. Despite the speeches and the appearances before this committee and the establishment of aggressive targets, it is my impression that the troops in the war, at virtually every turn, are having to reconvince the generals as to why they are fighting this war. There are a lot of unreasonable tests being put in the way of getting on with the job. I think that is evidenced by the fact that there have yet to be any demand management programs approved at the board level at Ontario Hydro, despite the setting of rather aggressive official targets for this.

On the last page, I think we just want to try to pull together some themes here. I will quickly address them, and Ralph may want to add some points.

We are talking about technologies like this, and we are talking about motors, and we are talking about ballasts and so forth, and there are a whole number of benefits from these technologies. There are electricity savings, and that is the prime interest that Ontario Hydro has. It appears that this is cheaper than building another plant. But I fear that paralysis by analysis is goin within Ontario Hydro on these measures.

Also, we would say that there are econo savings for the society at large from implementation of these technologies. This technology not just for saving kilowatt-hours kilowatts. It is a technology for genera wealth, because we will be placing less of a d on the utility budgets of our private and pu corporations, our householders and everyb else.

1620

There are environmental protection aspec technology such as this. Every kilowatt-hou do not consume in this province is a kilow hour of coal-generated electricity, becaus comes off the top. I refer you to the slide that Torrie had showing the makeup of the sup For the foreseeable future, we have coal at the of it and we can do an awful lot of conserva until we totally eliminate the coal burn in province.

To the extent that we conserve a kilowatt-l of electricity, we are conserving, with very exceptions, a kilowatt-hour of coal-gener electricity and we are consuming the sul dioxide and nitrogen oxide emissions of prob four thermal units of coal. Remember a ther generating station is about one third effici and we have line and system loss. So for e kilowatt-hour of electricity, there are kilowatt-hour equivalents of coal that we do have to burn and we do not generate X pounc SO_2 and NO_x.

Similarly, we do not generate Y pour because it has a different chemical makeu carbon dioxide and the impacts upon greenhouse effect. We are now in a situa where we are not only talking about environn tal protection; we are talking about cli protection, about lowering CO_2 impacts glc ly. We have reduced risk–technical risk economic risk–because these are small uni production that can be brought on in shorter frames. We have distributed employment other social benefits and a number of tec logical spinoffs if we want to seize that op tunity.

I have blathered for quite a while. Ralph you want to make any concluding remarks?

Mr. Torrie: I do not think so. I would r see if there are any avenues of discussio questions people want to raise before we rur of time.

Mr. Chairman: Before we move to q tions, I wonder if I might ask for any fu

nents you might have. You mentioned the ssive target for demand management by o. I think they have targeted 3,500 mega- ; of reduction in the DSPS. I wonder if you t comment on whether you think that is stic, conservative or optimistic as a target for o in the light of your studies.

r. **Torrie:** It is very low compared to what chnical and economic potential is, but given pproach that has been taken so far, it may be high relative to what Ontario Hydro is ole of doing. You know: "Ignore the cheap Go after the expensive stuff. Just give mation and hope that natural conservation ens. Make the customers contribute."

hat one looks for and one keeps hoping will day emerge is a symmetrical approach to rvation and supply. If there is a way of cing electricity use which makes sense, then lo it. You do not make the customer pay part Why should he? You do not put an ad in the e and Mail asking people to send in tions for the next nuclear plant before you a commitment to build it; you just go ahead lo it.

aybe it is going to take some time until it mes easier for some of the younger people to nto some of the more senior positions, but it s to me that until we see some kind of ge in the attitude within Ontario, then ably even 3,500 megawatts is more than are going to be able to do.

r. **Chairman:** Assuming changes get made hings get taken out of the way, are you g you could double it?

r. **Torrie:** Oh yes, sure. You could double

r. **Chairman:** Triple it? In a perfect world, would be the target? That is the question.

r. **Torrie:** When I finish this research I am g now, I would have no hesitation saying it l be doubled. I am not sure about tripled; e.

r. **Chairman:** Somewhere between two and times.

r. **Torrie:** That report will be, I hope, able to the committee before you have to your report, for what it is worth. We will inly be submitting it to the ministry within a r of a very few weeks, and I expect that the stry would be happy, unless there are a lot of ems with it, to send it over.

r. **Chairman:** We will look forward to ng that then, and perhaps it will settle the question. I will shift the general questions to Mr. Matrundola. You had a question.

Mr. Matrundola: Yes. I would like to ask the saving in energy by using an electric motor of the same capacity, the same horsepower–say, take a motor of 100 horsepower–one is low-efficiency and one is high-efficiency. What percentage of electricity would one be able to save?

Mr. Kelly: In a given single application?

Mr. Matrundola: In the same environment, a motor of the same size, everything being the same: one is high-efficiency, one is low-efficiency, both capacities are the same and have the same characteristics. In terms of percentage, whether it is 10 horsepower or 50 horsepower–

Mr. Kelly: It is quite a small percentage, depending on what size you are talking about. If you are talking about a one-horsepower motor–

Mr. Matrundola: It is negligible.

Mr. Kelly: –it is 10 per cent. If we are talking about a 100-horsepower motor, it is two or three per cent.

Mr. Matrundola: So the higher–

Mr. Kelly: The larger the size, the closer the spread in efficiency.

Mr. Matrundola: In efficiency. So there is a higher saving in a low wattage.

Mr. Kelly: A higher percentage saving.

Mr. Matrundola: Yes, it is a higher percentage that you are saving, whereas if you have a 500-horsepower motor, the saving is–

Mr. Kelly: It is a low percentage, but the cost of running a 500-horsepower motor is incredibly large, and even an incremental change in the technical efficiency of that motor can have large dollar implications and can pay for the cost of the higher-efficiency motor in a year or two.

Mr. Matrundola: In other words, the more powerful the motor, the lower the percentage, but then you save on the size, on the amount in general.

Mr. Kelly: Yes.

Mr. Charlton: The one question that I had has been answered, but it leads to a couple of others.

It seems to me that if you go through your presentation today, and specifically through the number of barriers parts that you showed us, although it is fair to say that there are problems with the Power Corporation Act and things like that in terms of Hydro's ability to deal with some of the barriers that are out there, there is a whole range of barriers that, it seems to me, require rather major involvement outside of Hydro as

well. Is that a fair comment on what you have seen in terms of barriers and what will have to happen?

You talked about standards, for example, as one of the things that could be dealt with to correct some of the problems in the motors sector, and obviously, that is not Hydro's job. We are going to have to have some fairly significant government initiatives if we are really going to start to get at some of the real potential that exists in the kind of study you have done.

Mr. Kelly: I am a fairly firm believer in the effectiveness of standards and, furthermore, the acceptability of standards. Some people like to describe standards as draconian, interventionist, socially unacceptable and every other pejorative term you can think of. As a student of public opinion on this for the last 15 years, I think you would find a great deal of public support, personally–not standards that say in your house you have an energy budget and you cannot consume more than this, or you cannot buy a big car.

I am not talking about that sort of standard. I am talking about standards that pertain to the technical efficiency of products that are bought by home owners, businesses and commercial buildings. I think you will find a lot of support in that community for upgrading the level of efficiency through legislation, through standards.

Mr. Charlton: Another thing bothers me about the whole discussion around conservation, and Mr. Kelly, you specifically referred to it when you talked about the British Columbia program where they were giving a $75 rebate in the Queen Charlotte Islands if you bought the high-efficiency refrigerator, and then they gave a $40 bounty if you turned in the old rag. We all understand the downside potential of people buying a new fridge and taking the old one and putting it in the basement, because people have been doing that for 20 years. Sure, we have to find ways to stop that from happening, for the sake of energy efficiency, but people have been doing that for 20 years now outside of this whole debate around energy efficiency and conservation, and it really bothers me when we start to say that the promotion of energy efficiency may cause people to do that. They are already doing it. We tend to throw a whole pile of misnomers into the energy-efficiency debate, and I think we have to start dealing with that instead of just stating it.

1630

Mr. Kelly: Yes, I regret that one, becau think it is overemphasized. Even at the leve $75 a refrigerator, I do not believe that is goir allow somebody who would not otherwise go and buy a new fridge and then use the old or do so.

Mr. Charlton: That is right. People go and buy fridges for several reasons. The old is not working, and then it is not going to en in the basement; or the old one does not fit in their kitchen any more because it is 15 years it is a bit discoloured, they have amortizec cost they paid for it and they want to something new to match the decor in their kitchen, to match the stove probably as wel they have in fact already decided that they to put the old one down in the basement, ir rec room, and get a new fridge.

Mr. Kelly: Yes, I think the effect of the does not cause the double-fridge syndrome. were going to do that anyway.

Mr. Charlton: Right.

Mr. Kelly: What you have done is cause to go from a medium-efficiency new fridge high-efficiency new fridge.

Mr. Charlton: I think that is the poin have to start making when we hear these b slide comments about the potential for conse tion in fact to cause an increase in consum when the increase in consumption would l happen anyway, and perhaps to a much gr extent, if you did not deal with promoting en efficiency.

Mr. Torrie: You cannot possibly caus increase in the consumption by having en efficiency standards on new refrigerators. not understand how it could happen.

Mr. Charlton: I agree; that is what saying.

Mr. Torrie: Just the opposite.

Mr. Charlton: It is put to to us by Hydr by others. Among some of the presenter have had here we have people saying that we encourage this and we may encourage th promoting energy efficiency when in fact m the things they are talking about are going

Mr. Torrie: One of the things that this g is that there is a difference between what r be the most suitable approach for prom some types of conservation over others. are a lot of things that use energy where the of energy is not a significant factor to the u that device, either because it is very sm

ause it is much less important than other ors involved in that device.

ery few people buy–I should not say "very ," but energy consumption is only one factor ne purchase of a fridge. I do not know what would find if you did the research, but I think would find that the colour, doodads, gizmos, gadgets and all of that are right up there. re is a perfect example for just putting a dard on it. Do not put people through the le. This is what Ontario Hydro is going to out over the next few years when it proceeds ke just about the most difficult possible route ginable to achieving energy conservation, ch is to try to affect consumer decisions at the end of the tube when a few simple standards he manufacturing level would solve the blem in those kinds of areas.

ut then there is a whole other type of servation which has to do with the working r of commercial buildings, with the retrofit- of commercial buildings. It is very ployment-intensive, information-intensive knowledge-intensive. If it were ever done, if commitment were ever made, it would uire a very strong industry, it would take the l of government-industry co-operation which been behind most big efforts in this country one can think of.

ou would have to have a vice-president at ario Hydro who really understood it and who serious, and you would have to have a uty Minister of Energy who really under- d it and who was serious, and a Deputy ister of Education, a Premier and a very ng industry management association. Those the ingredients for achieving that other type onservation, because you are really talking ut one segment of what is the more general sition to the post-industrial age where infor- ion and information-intensive technologies ome much more prevalent than they have n in the past.

will happen eventually. The question, I k, is really whether we will be buyers or ers. If we sit around, as we have been, then will be buying Japanese refrigerators, just as are buying Japanese cars, and we will be ing German this and Swedish that because we did not have the wherewithal to see what was ing. It is the downside of low energy prices.

Ir. Charlton: One last very brief question: iously, in the conservation studies that you e done and the ones you are working on now we hope we will see shortly, you have looked ome of the stuff that has happened in the US. In the data you have looked at from the US, can you define, or do you get any impressions, at least, in terms of what impact major aggressive, public sector involvement has on the acceleration and the success of those programs?

Mr. Torrie: I am not sure that was your question, but there was one slide that we went over pretty quickly, but it is an attempt to measure the impact of just the appliance standards–not just the appliance standards, but the whole national energy efficiency act or whatever.

Mr. Kelly: The National Appliance Energy Conservation Act.

Mr. Torrie: Is that what you mean? That is not what you mean.

Mr. Charlton: No. That is part of what I am asking. I think I am asking a whole range of things. For example, they have done a test program on refrigerators in the Queen Charlotte Islands. What were the results? What did they find in terms of the impact of the incentive to shift the purchase?

Mr. Kelly: They were overwhelmed by the response to that program, much higher than they anticipated and projected.

Mr. Charlton: So when we get back to the discussion, then, of all the barriers that we talked about in your presentation, is it fair to say that all the barriers can be overcome in a demonstrable way by the programs that you design? Do we have examples of the kinds of barriers you have set out? For example, for our commercial sector, in some jurisdictions that have taken an aggressive approach to overcoming those barriers, they have been successful in doing it.

Mr. Kelly: I guess I would have to say that, in principle, all those barriers are assailable through a wide range of tools. There is no one simple tool. You cannot say it is all standards or it is all rebates or it is all information. It has to be a designed combination of them. It takes a lot of research. The American utilities are five to 10 years ahead of us. There are lots of lessons that we can learn from them.

There are lessons right here in Canada that we can learn from past conservation programs as well that have been run by federal and provincial governments. I think a number of errors have been made in this country and in the United States. We are going up the learning curve. The programs are getting better.

The types of programs I see being conceived in Ontario Hydro–not yet delivered but at least

conceived–are benefitting from looking at the lessons learned in the American programs.

A simple case in point is that if you are designing a rebate program for energy-efficient fluorescent lamps and you are going to give a rebate of X cents per lamp for the number of lamps in the building, you probably want to offer an additional rebate to make sure that they stock energy-efficient lamps in the stock-room in the basement, so that when those start burning out they have energy-efficient ones to put in, they do not just start putting the standard ones back in. That is a small nuance in the design of the program to make those savings permanent and to make them lasting. That is one tiny example.

Mr. Torrie: Mr. Chairman, I wonder if you would excuse me. There was an accident in my family last night. I have to try to get the 5:30 flight.

Mr. Chairman: Certainly, yes. We thank you for coming in and being part of this presentation.

Mrs. Grier: The presentation we had yesterday was from the man from the W. C. Wood Co. He made a very strong plea for common standards and rational standards.

Mr. Kelly: Common to the United States and Canada?

Mrs. Grier: I think so. Generally, common everywhere, so I think he was talking primarily, obviously, about the US because of the free trade deal. Would you agree with that? Are those standards adequate, or should we look in Ontario for something specific?

Mr. Kelly: I think their standards are adequate. I think they can potentially be raised in the future. There is provision in the American legislation for automatic review and possible increases of the minimum efficiency or consumption standards in the American legislation. The American manufacturers supported that legislation, by the way. You should not get the impression that government somehow forced unwanted legislation on the manufacturers. There was a situation there where the manufacturers knew it was technically possible; they were faced with a situation of an unorganized plethora of state standards versus one tough federal standard and they agreed it was better to have one uniform meetable but tough federal standard than potentially 50 different state standards that would balkanize their marketplace and they supported that legislation. It was a rather unique example of tripartite support where the legislation, uniquely enough, was written not by legislators or by government employees but by a coalition of manufacturers, environmentalists and ener[gy] conservation advocates.

1640

Mrs. Grier: I think you said it was the produ[ct] of a great deal of compromise and agreeme[nt]. Therefore, I just wanted some sense as whether it was an adequate compromise a[nd] whether we should head for it.

Mr. Kelly: I think so.

Mrs. Grier: The other thing I want to a[sk] about is that one of the difficulties, we gathe[red] from earlier presentations, in arriving at adequate estimate of what the potential was energy efficiency and saving was the lack of d[ata] on which to base end-use modelling. It is obvi[ous] from all the information you have given us t[hat] there is a heck of a lot of data out there. Wh[ere] did you get yours from and why has not Onta[rio] Hydro got it?

Mr. Kelly: Hydro probably has as much d[ata] as we have, plus. There is a lot of data. There [are] frustrating gaps in the data, however. We do [not] know how many square feet of commercial of[fice] space there is in this province.

Mrs. Grier: Come on. Every municipa[lity] knows, and could you not just add them all u[p]

Mr. Kelly: Nobody has done that. It migh[t be] a job for someone for a year to go to ev[ery] municipal clerk and find out where those data [are] stored and add it up. That is assessment d[ata]. How accurate that is is open to some questio[n]. [I] do not want to get off on that too much, but th[ere] are a large number of data problems which plague this analysis. In some cases, that coul[d be] assisted by the industry if it wanted to [be] co-operative.

So far, the Canadian manufacturers of ap[pli]ances will not provide us with the data on sales by efficiency; so we are forced to use total range of products and numbers of model[s] [in] the market rather than saying, "At this effici[ency] level, there were 5,000 refrigerators so[ld]," because that would allow us to track wheth[er] [or] not consumers are indeed moving tow[ard] high-efficiency refrigerators or whether m[anu]facturers are just offering them and there [are] relatively few sales. We do not know how m[any] sales there are of the high- or the low-effici[ency] ones.

Mrs. Grier: Thank you very much.

Mrs. Sullivan: I had a couple of observa[tions] about your presentation rather than question[s]; you might want to respond to these. Ea[rlier] today, we heard from people involved in [the] R-2000 program. One of the things that was

ing was that the program took place over a od of time before it actually began to have an ct in the market, and indeed that impact is relatively small. These things do not happen night and the marketing, training and dealer private sector involvement is vital in terms of e programs.

ne of the things you have done that is useful talk about the potential, but the practicality tting to the final use is something that has to place over a long period of time with the lvement of a number of sectors. One of the rs you left out, it seemed to me, was the ate sector in terms of its marketing efforts in iency products. I was surprised, actually, your remarks were really more designed to ral standards, provincial involvement or ific matters that Hydro could do when in y sectors technological improvements are as a market advantage rather than as ething deleterious. Those are observations.

r. Kelly: I do not mean to leave the ession that I am saying it all has to be done ydro and the government and that there is no for the private sector. Far from it. I am ng that there are situations in the infrastruc- that are limiting the potential of the private or to go out and sell these new technologies: energy prices, lack of training, a whole range ings.

et's take motors. A motor manufacturer es a range of motors. There is very little ntive to flog the high-efficiency motors. That ld require them to be out there doing an awful f educating and convincing, which does not them as a private company. It is easy for to rest on their laurels and just sell the efficiency motor; they probably makes more .

rs. Sullivan: Towards the end of your entation, you use the words "designed ram." It seems to me that is what has to be ked for rather than building expectations of ething that will happen within an immediate od, when in fact, with the situation which ts in the market and in terms of the promotion development of those programs, it is going to omething that will occur over a period of .

r. Kelly: No doubt there is a long lead time chieving much of this potential.

rs. Sullivan: That is not to say that the base ld not be built now.

r. Kelly: Yes. It takes a long time to have an ct. That is an argument for getting started now, not deferring it, because it takes a long time.

Mrs. Sullivan: Most of the conservation efficiencies you have discussed, I assume, relate to the base power rather than to peak periods and so on. Those efficiencies will affect base time in terms of generation and load.

Mr. Kelly: Depending on the technology you are talking about and the application, a conservation technology can have a large impact on peaks or it can have very little impact. With electric heating, the peak is in the middle of the night when you are already off peak in the Hydro system.

Commercial lighting, on the other hand, is on the customer peak and on the system peak every day of the year because it is on when the system reaches its afternoon peak and it is on on January 21 when the system reaches its annual peak on a cold winter afternoon. Most conservation technologies are also peak-reducing, some less so than others.

Mr. Passmore: You have talked about some of the frustrations that you have with respect to the barriers and some of those barriers being Hydro's ability to deliver a program. Suppose, though, that the government did institute a policy which was basically going to go after those 26,000 gigawatt-hours you talked about as a target and instructed the utility that it was one of the delivery mechanisms for that target.

One of the debates this committee is currently considering is how that would be monitored. Who would then see whether Hydro was delivering government policy? Do you have any views on what would be the best mechanism? One of the suggestions made by the technical advisory committee, for example, is that that would be a new role to define for the Ontario Energy Board. Would that be acceptable to your sector?

Mr. Kelly: I think that would be quite an effective mechanism. That should allow, with some bolstering, the analytical capability to be developed at the OEB to look in detail at these. I realize committees like this can do a certain amount, but the degree of technical detail to which you can afford to go is pretty limited. I think, in principle, I would support the idea that one of the functions, among others, for the Ontario Energy Board could be to review Ontario Hydro's demand management programs.

This is quite a common situation in the United States, where public utility commissions review and in many cases require utilities, both public and private, to achieve certain conservation

targets. A large part of the time of public utility commissions, in the United States in particular, is taken up in reviewing that sort of material.

Mr. Passmore: But you are suggesting that the Ontario Energy Board would require additional resources in order to be able to accomplish that?

Mr. Kelly: It seems to me it would.

Mr. Chairman: I would like to thank you for coming in and making the presentation. We run well over the allotted time, but I think says something about the information you imparting to us, so we thank you.

Mr. Kelly: I will leave copies of the studi anybody really wants to plow through it.

Mr. Chairman: I will adjourn the comn until 10 a.m. next Monday.

The committee adjourned at 4:51 p.m.

CONTENTS

Thursday, September 15, 1988

SELECT COMMITTEE ON ENERGY

rman: Carrothers, Douglas A. (Oakville South L)
Chairman: McGuigan, James F. (Essex-Kent L)
n, Michael A. (Algoma-Manitoulin L)
ton, Brian A. (Hamilton Mountain NDP)
ıtz, Sam L. (Durham East PC)
, Ruth A. (Etobicoke-Lakeshore NDP)
ındola, Gino (Willowdale L)
Michael C. (Windsor-Walkerville L)
iman, Robert W. (Leeds-Grenville PC)
, Larry (Frontenac-Addington L)
'an, Barbara (Halton Centre L)

titutions:
ch, Michael M. (St. Catharines-Brock L) for Mr. Brown
ert, Frank (Scarborough-Ellesmere L) for Mr. McGuigan
ett, Joan M. (Northumberland L) for Mr. South
s, Michael D. (Nipissing PC) for Mr. Runciman

: Manikel, Tannis

:
nore, Jeff, Consultant; President, Passmore Associates International
er, Lewis, Research Officer, Legislative Research Service

esses:

ı Enserve Financial Corp.:
'n, Stephen, President

ı Bechtel Canada Inc.:
er, R. W., Senior Vice-President, Marketing

ı the Canadian Association of Energy Service Companies:
, Tom, Chairman
Frederick T., Vice-President, Econoler Inc.
enberg, Hugh, Marketing Manager, Commercial Buildings Group, Honeywell Ltd.
James W. S., Senior Vice-President, Rose Technology Group Ltd.

ı the Ontario Home Builders' Association:
, Paul, Regional Manager, R-2000 Program

ı the Canadian Home Builders' Association:
an, Don, National Director, R-2000 Program

ı Marbek Resource Consultants Ltd.:
, Brian, President

ı Torrie Smith and Associates:
, Ralph, President

Ontario

No. N-16

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy
Electricity Demand and Supply

First Session, 34th Parliament
Monday, September 19, 1988

Speaker: Honourable Hugh A. Edighoffer
Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the ba together with a list of the members of the committee and other members and witnesses tak part.

Reference to a cumulative index of previous issues can be obtained by calling Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Ser Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Tor M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Monday, September 19, 1988

[T]he committee met at 10:15 a.m. in room 228.

[E]LECTRICITY DEMAND AND SUPPLY (continued)

[M]r. Chairman: Our first witness this morn- is from Etobicoke Hydro. I believe John [Ha]stings is here from Etobicoke Hydro. Perhaps would come forward. Members, you have h been given a copy of Mr. Hastings's [pre]sentation. Mr. Hastings, if you would formal- [i]ntroduce yourself for the purposes of Han- [sar]d, I will then turn the floor over to you.

ETOBICOKE HYDRO

[M]r. Hastings: I am John Hastings, vice- [cha]irman, Etobicoke Hydro.

[R]ather than read the brief, if it is appropriate, [per]haps I could go through and point out or [hea]dline the major themes and thrusts and then [lea]ve it open to you as to where you want to [pro]ceed, because everybody else can read, [bas]ically.

[M]r. Chairman: I hope so, yes. We have an [hou]r. If you would like to do that, we will then [ope]n the floor for questions from the committee the rest of the hour.

[M]r. Hastings: Essentially, in the first part, we [hav]e given you a little bit of background about utility. The first page, which should really [hav]e been an addendum and probably should [hav]e been placed at the back of the presentation, [giv]es you some profile as to what kind of an [ope]ration we are in terms of size, volume, [nu]mber of customers, etc. We have just cele- [bra]ted our 70th anniversary. We had a public [bir]thday party on Saturday to commemorate the [eve]nt.

There is a lot of change taking place within our [or]ganization, as there is within most organiza- [tio]ns today. We are currently spending a [con]siderable amount of money to update our [tec]hnology in terms of our conversion program, [goi]ng from 4.6 kV and 13.8 kV to 27.6 kV. It [wil]l take approximately 20 years to complete this [pro]ject and it is going to cost us substantial [mi]llions of dollars.

We have invested a tremendous amount of [mo]ney in updating our computer facilities to [pro]vide for better customer service. We have [ma]de a significant launch into the area of automated mapping and facilities management. We have made some significant strides in computerizing our customer service for billing and meter reading. We are trying to get on track with what we think are going to be some significant changes into the year 2000.

To get into the area of our comments on Meeting Future Energy Needs: Draft Demand/ Supply Planning Strategy, the major paper presented by Ontario Hydro, we essentially do not disagree with the fundamental thrust of having demand initiatives. In fact, our utility, being the seventh largest in Ontario, is already participating in some fairly significant activities with Ontario Hydro, to get demand initiatives into operation and to be made reality, especially in the areas of load-sizing, dealing with large customers for commercial and industrial seminars and how to make more efficient use of electrical power as a cost-efficient product. We are working with Ontario Hydro in the area of load management. We recently passed a motion at our commission to involve ourselves, in January 1989, with time-of-use rates for large-scale users.

I think we are basically on side in terms of demand-side initiatives. We are not debating what is, in essence, a motherhood. I do not see how you could argue that you would not want to try to save product, to make your product more efficient and effective in terms of its use and applications for all types and classes of customers.

What concerns us more than the demand-side initiatives is that when we read the draft strategy, there is a distinct impression laid out in the document that there would be a greater value or priority placed on demand-side initiatives within Ontario Hydro rather than on getting on with doing some major building.

1020

This may run against the current to some extent, because a lot of people out there probably think we have enough supply, that there are enough facilities and that they should take us through for 20 or 25 years, maybe the rest of my lifetime and a good portion of the lifetime of the rest of us in this room. But when you start looking more closely at the figures, the projections and forecasts, even if they may be

somewhat questionable in certain areas, it would appear that the demand initiatives, as set out in the draft strategy, will carry us only into about 1996.

What concerns us most is that we are finding that in the corporate thinking of Ontario Hydro there is a greater emphasis placed on demand initiatives at the expense of supply strategy. We believe there should be a more equal balance between the two and that the priority for the supply side should not be downgraded.

One could argue, I suppose, if you read the document that it would appear to be fairly balanced. You have to read it several times, though, to get that impression. Talking with different professionals at Ontario Hydro, especially at the top, we still sense that there is a tremendous degree of importance placed on the priorities of the demand side. We hope this committee would look at what impact those demand initiatives may have if they are taken at the expense of the supply side.

We believe, from our own limited experience within our utility, that you have to have more emphasis on supply options, given the problems we have had with our own plant capacity and our experience with demand by customers. My most memorable event as chairman was my trial by fire in July 1987 when, in a very strong summer, we had severe heat for about a week where the temperatures were very clearly more than our utility could withstand. We had over 150 transformers out at one given time. It made us pretty aware that we had better get on with upgrading our facilities in terms of the types of transformer capacity.

It is this sort of event, but not that one in itself, that has led us, having read the draft strategy, to believe there must be more emphasis on, expenditure on and commitment to resources on the supply side than is accorded in the document itself.

I would like to comment to some extent on the initiatives of Ontario Hydro from our own perspective. Ontario Hydro believes load shifting is a viable option that can save about 1,000 megawatts by the year 2000. Our own feeling is that while there are some significant savings in load shifting, perhaps the forecasts of the savings that can be derived, from whatever type of demand initiative, may be somewhat higher or more optimistic than we should look at. We find this throughout the document, to some extent.

This is not to say you cannot work towards saving 1,000 megawatts of power by the year 2000, but our thinking is, and the question is, is that perhaps a trifle too high? Should the fi not be more in the area of perhaps 750 to megawatts?

Looking at cogeneration, one could argue it certainly would be a valuable way of hel large users and some of our major reso industries when you combine it with the a ability of waste fuels, but I think it is unquantifiable situation as to what numbers can come up with. Unless I misread document when we were looking througl there is not a specific figure accorded to number of megawatts.

One could not disagree in terms of tryir improve energy efficiency standards for h appliances and for various equipment and chinery in industry, but looking at the docun it is going to be the long haul, probably r years than we care to admit

Financial incentives can play an impo role, but having talked with a number of pe in the industry not necessarily reflecting traditionalist view, one of the problems committee may face in trying to come to with the application of financial incentive how do you do it fairly to each customer and of customers under the given statutes, such a Power Corporation Act and other similar leg tion? We would not argue against fina incentives, but I think they have to be carefully applied, pretty scrupulously look by the accounting profession and by audito

The next point under demand initiatives is Ontario Hydro must work even more vigor than perhaps it has already to promote spe demand options for many years, because public expectation is that hydro suppl limitless, even though that same public placed substantial restraints on the producti that hydro supply. It is going to have to wo the senior utility with the municipal part They are now upgrading us and calling us al equal when in fact the reality is somewha reverse, that we are still the juniors in this game, a sort of Knoxville AA arrangement r than even up in the International Leaque. going to have to work with the utilities t these demand initiatives into operation.

When Ontario Hydro is dealing wit models, studies and assumptions, I think it look more closely at all these variables t whether it can come up with more specific, realistic and more achievable numbers and than it already has.

Turning to page 8, Etobicoke Hydr essence, while it congratulates Ontario Hyd

ing an awful lot of work on the demand options d doing a lot of thinking in this area to get dustry and commerce in our province into the 90s and beyond, would propose that there ould be more planning for various supply tions; not only that, but that these supply tions, whichever one or ones the committee ay recommend, should look at speeding up the ocess and the implementation of projects.

It would appear to us, as a utility, that from an vironmental protection perspective, taking 10 15 years to decide whether a given supply tion is viable, in terms of the economics, sources, commitment and capital layouts, is tirely too lengthy a time frame. I would mise, from the reading of journals and talking th people from other countries and jurisdic- ns, that we must be probably one of the lead ovinces in having the longest time frame in ciding what we are going to do, if we are going do anything, about a specific supply option. If u look at some of the other countries, I am tain they do not take as long. In effect, our pression is that it is almost tying your hands hind your back and letting the competition get ead of you or giving them an extra eight city ocks to do what they have to do. I think it make uncompetitive.

30

When we look at whether Etobicoke Hydro stomers would want us to just brush over the gulatory or the hearings approval process, tainly we are not advocating that. But I think a of people in our area, in our city, are ncerned that it does take such a long time to cide what we are going to do. We would ongly advocate to this committee, when it oks at this whole subject–and I am certain we ll not be the only party presenting a viewpoint whether it is 12 or 15 years before a supply tion should be made realistic and put into eration–that there be an awful lot of reduction the time frame. If you cannot implement a draulic generating station within two years om the actual concept to the actual implementa- n, then it would appear to us that environmen- protection hearings and all that become used to some extent.

One cannot apply the same standards exactly the operation of a nuclear supply option, but believe you should be able to carry out the arings, the studies, have the public participa- n, the consultations and everything in place thin five to six years. That seems to me even ore than reasonable. To go beyond that, it ould appear to us that 20 years before they actually start the construction of a nuclear plant or a coal-fired generating station means taking up most of one of our working lives.

The question I would ask members of this committee, because I have been asked by customers, is, do you believe the rest of the world is going to take the same leisurely approach to doing these things? Furthermore, are you as MPPs or myself as a Hydro commissioner, going to be able to give an answer to somebody in 1990 or 1994, who may be one of your constituents or my customers, if we have not made more clearly coherent commitments to supply options, whatever they may be. They will phone you up. Will you say to them, “We’re still looking at the subject” when their business fails? Or do you think an elderly woman in a nursing home or in her own home is going to accept an answer that she is going to have to cut back on air-conditioning in the heat of the summer if the experts are half-correct about what is going to happen over the next decade or so with the greenhouse effect?

Are you going to be able to appeal to a customer like that, that he is simply going to have to reduce his air-conditioning comfort because there is not sufficient water to go through if that air-conditioning system were directly connected to and reliant upon a hydraulic system of power? I think you are going to get some pretty strong answers from your constituents, whoever they are or whatever type of customer. I do not think they are going to accept the point that we are still looking at it when they have had four summers of long heat. One summer does it. I am certain that my experience and the heat of customer wrath have been shared by yourselves at some time.

I think it is a very saleable point to look at when you are looking at all the demand initiatives and supply options–what is in it for the customer and are we going to speed things up to help the customer?–because somewhere down the road in the next 10 years, these questions are going to be asked more and more.

In essence, we believe many professionals at the municipal utility level would argue that the nature of generating facilities really does not apply to a utility such as ours because we are more concerned with distribution. In fact, it is relevant because if you are going to be a distributor, you have to have this stuff in supply to be able to distribute it properly and efficiently.

We submit that the best form of generation is hydraulic, but we are running out, as the report clearly implies. It states that most of the best sites have already been used unless we are going to

spend an awful lot more money to use the rivers in northwestern Ontario and divert them south. I think that if we start doing that, we will probably add to our climatic variances more so than we already have. Certainly, we can use hydraulic. I am glad to see Ontario Hydro is moving on its Niagara hydraulic facility.

Fossil generation: Essentially, with respect to this type of supply option, I do not think we are going to be building very many more gas, coal-fired and coal-generating facilities because of the types of products released by coal, specifically acid gas emissions, sulphur and the dioxins.

I think the environmentalists have made their viewpoint pretty clearly known with respect to fossil generation. Even if you install better coal-burning technologies than we already have, again it is matter of cost that becomes important to the customer. It seems to us that Ontario Hydro finally has accepted the virtue of nonconventional small generating stations owned by independent operators and some even owned by its own utility operations.

All these things help, but I do not think they are going to aid in helping a large number or any large portion of our 93,000 customers. To think so is being a little romantically inclined. I do not see how a 15-megawatt power station in northeastern Ontario will really help our customers to any great extent in terms of reliability of that power.

Purchases: It would appear to us that Ontario Hydro is still persistent in its thinking that you can save money if you purchase power from other hydros such as Hydro-Québec, Manitoba and what have you.

It would appear to us with this purchasing of power that, aside from times of great emergency, which nobody would argue against because you want to have safe reliable power, we should not be so reliant upon the purchasing of power in normal times because we are dealing with a pretty economically competitive world out there.

While we have pretty good relations with the producers we are buying it from, who is to say what will happen in the next 10 to 12 years with respect to these same suppliers? The actors in the drama change. They may want more money. They may want to reopen contracts with respect to supplying options. Witness Newfoundland and Labrador Power and Hydro-Québec and the dealings they have had over the years as two senior utilities.

We would think Ontario Hydro should carefully re-examine its too-ready acceptance of wanting to buy power from other agencies, sayi "That will tide us over; we will not have to bu any more generating stations for another 1 years," when in effect we become an impor rather than what we believe should be Onta Hydro's role in this area–a net exporter power–because in this province you are ga bling with its economic future and with peop lifestyle by becoming too dependent on outs supplies. It is a very seductive option on whi as I have said, you can save money in beginning, but you create an awful lot problems down the road when you becc overreliant on this option.

1040

The nuclear option: This option has made do an awful lot of thinking. We do not come easily nor readily, but we are realists and we in a world where perhaps the realities and choices are not always the best. We may personally like it, but we have to look at it fr the viewpoint of our customers. Our custon are expecting us to act on providing s reliable, economically priced power. A lo people would argue that the nuclear optio anything but. However, I think the figures sl there are some economies of scale when you for nuclear.

We think there is more reliability in this sou of power. We think it is an environment acceptable type of option, not without disadvantages, and one of the significant di vantages is more research and development ir field of trying to find ways of storing the stuff comes out the other end. What are you goin do with nuclear waste?

In essence, when you survey or talk to customers, while they are aware that it problem, they are not saying, to us at least, " should not proceed with nuclear expansion o greater emphasis on it, because we want s reliable, economically priced power." They not saying to us, "We are willing to sacrifice lifestyles, our comfort, our convenience and air-conditioners." I have not had too m company presidents or people who work ir metal machining industry, as an example, sa me they are willing to cut back on production or their exports of whatever typ product they make in that field if we do not n to nuclear. They may not be thinking of it they are looking at us to provide leadership ir area, and the best one we can find is the nu one in terms of being able to provide reliability.

You can argue, I suppose, on the other side ally vociferously, but you had better be ready ay that the other options are going to give you much reliable, economically priced power. tainly, again with respect to rehabilitation, intenance and repair, because we are engaged t ourselves, ageing plants should be rehabili- d and repaired if the costs justify the ension of the life of the plant. We are debating going over some of those options in our 8-89 budget.

Ve recommend that Hydro's priority be rdered so that its maintenance and repair get, which seems to us to have declined over last few years, be increased. If you look at the ario Energy Board's recommendations with ect to previous hearings, they are that there greater emphasis, an increase or reallocation expenditures back to about the 60 per cent el, for dealing with existing plant. For many ple I have talked to, and I am sure you have ady heard it, Ontario Hydro is not really ing sufficiently close attention to its existing it. This comes more from the professionals i myself, as a layman in this field, but when eral professionals keep saying the same thing ifferent shapes and forms, there must be some iel of validity to their viewpoint.

tarting on page 16, we have made some ommendations in terms of what you may want ook at with respect to looking at Ontario lro as an organization. Mr. Franklin, in his resses to us at our gatherings, has referred to ario Hydro as the company. I do not think it is thing new. I suppose it is the sort of thinking, outlook and attitude, that goes on within such ge organization. But perhaps we should look ond what it means when they refer to Ontario lro as "the company." Should we be looking ome means and ways of Ontario Hydro being e a real company from a private sector vpoint? The professionals and people who k in this organization already call it a ipany.

or example, should there be more bottom- discipline than there is? Should they be ing net surpluses really what they are, its? I do not see anything wrong with that d. Should they be looking at more specifical- eyed performance incentives for their profes- ials, whether it is in marketing, engineering onstruction, from the linesman right up to the so that people would say, "Yes, this is our ipany," in the sense that it is the company for k purposes?

I do not think the people of Ontario would create a revolution if the workers at Ontario Hydro called their company in more endearing terms than "the company," but had a sense of ownership to it. I do not think the people are going to feel that their ownership has been lessened by people in the company thinking they own a little bit of it. They would not have controlling majority shares in it anyway, even if you issued shares; which leaves us with one of the points that I think may be outside the mandate of the committee, and forgive me because I have not looked at all your specific points within the mandate, but perhaps we should look at privatizing some of Ontario Hydro.

This goes against the grain in many respects because it is going against tradition, but if Hydro is going to need billions of dollars for new generating facilities and even to implement its demand initiatives in the next few years, then possibly this is one of the options to be looked at. It is not a be-all, cure-all answer, but it might be one way of providing some additional equity so that we can say to the people, our customers, that it is not just a myth when you look at our books and it says "this utility's share within Ontario Hydro," which is old accounting terminology. We really do not have such a share, if we wanted to withdraw, if that option were even available, which it is not. Maybe we need to get rid of that myth and put some flesh and bones on the reality.

Furthermore, the final thing we would like to see the committee look at, if it is within its mandate, is the whole question of regulatory authority. If the utilities are going to be truly partners with Ontario Hydro in all these demand initiatives and if they are going to have the manpower to carry out these initiatives, then it would appear to us we need to have a little improvement in our status, that we are not just the mere juniors but we do have some clout and the people at Hydro regard us, if not as equals at least more closely as equals than we already are.

If we are going to have to go into the whole area of regulating everything, more regulation than there already is, then it is incumbent upon the people who are proposing such overregulation, as we would call it, to cost-justify it; the same as when you want to have all these hearings move into year 15, so that the public and the customers can see, "That cost another 25 cents," or whatever the figures are–in other words, that people get that sense of thinking and outlook.

The final thing is that while we are somewhat critical of Hydro, we think it has done a reasonably good job in doing this study. They

have put in a lot of man-hours, a lot of thought has been put into it, and while we are all human I suppose, they have really tried to shift their thinking away from being a systems builder to a demand supplier. We are saying let us sort of get back on side and be a little more balanced in both. That essentially is our presentation. I think I may have taken a little too long.

1050

Mr. Chairman: No. Thank you very much, Mr. Hastings. We have about 20 minutes left in the time frame.

Mrs. Grier: Thank you, Mr. Hastings. I have been well served by Etobicoke Hydro for 20 years; so it is nice to have the opportunity to have this exchange.

I wonder if, as a beginning, you could perhaps expand a bit more on your final comments about the regulatory environment. Are there specifics that you would recommend to us or specific problems that have caused you difficulty in the past?

Mr. Hastings: I will give you one example. Like most utilities, when we were developing and expanding over the last 20 or 25 years, we ended up with a surplus supply of land. We have several lots in our city which we no longer need for transformer stations because of changes in population, people, the number of children living in certain parts of the city and changes in technology. We have this land sitting there and we have started to sell it because we will need the money for conversion, etc., but you would not believe the number of approval groups you have to go through in order to be able to sell this land.

You would think it was a major corporate decision, that our staff did not have the competence and that the commissioners did not have any common sense when the staff recommends that a given lot in a subdivision be sold. Normally, they do not do just that. They look at their needs, etc; they make their recommendation in a report; we approve it. We have pushed for the sale of some of this land, not all of it, quickly, because of our capital needs. It takes approximately a year from the time we make the decision that the land is surplus to when Ontario Hydro, at its staff headquarters and corporate offices, says, "Okay, you may do so." Even the staff find it somewhat limiting, I believe.

It is just one example of overregulation and it is perhaps one of the areas they need to look at. We are still on a leash, so to speak, but I think maybe the leash should be made a little longer, if nothing else. That is just the one example, but it illustrates the overall–

Mrs. Grier: How closely you are controlle

Mr. Hastings: Yes, extremely; too much s we believe.

Mrs. Grier: You mentioned the Pow Corporation Act. We have heard from so other deputants about the limitations that places on their ability to do incentive-bas demand management; yet I was struck by the f that you make reference to Etobicoke Hydro a Ontario Hydro offering dual-energy progr grants to encourage the installation of h pumps. I had the impression that this kind incentive was prohibited under the Power Corp ration Act.

Mr. Hastings: It may be prohibited, bu suppose it is a contradiction in reality. As hum beings, we all go beyond the statutes sometim They find a reinterpretation, some way in whi they can still say, "We are consistent within t wording of the legislation, but here is what need to do in order to get on with making this example of the demand initiative."

Mrs. Grier: In that kind of a program, are t marketing and the advertising done by Eto coke? It is a local project?

Mr. Hastings: It is usually done on a sha basis with the other utilities, as most advertisi programs are. Not all of them are, but in t instance it is done both by our utility and o co-operative advertising basis.

Mrs. Grier: So that the degree to which i successful or the amount the local utility puts i it is, to some extent, determined by Onta Hydro's commitment to the project?

Mr. Hastings: That is certainly true. It als influenced by our competition. I suppose commission has been excessively concern with the competition the gas companies provi us. We misfocused in the beginning on the f that we were losing customers. It has come only in the last year that we have refocused. effect, what we really need to be doing is looki at it in terms not of a loss of customers but reshaping the load we have to deal with. Tha what we really are starting to focus upon.

There was a sense of urgency, I suppose, that we wanted to try to keep pace. We w losing customers to gas because of cost. Tha why we have put a lot more emphasis into tryi to retain and expand modestly in this area.

Mrs. Grier: What about the whole area high-efficiency appliances and lighting syste about which we heard something last wee Have you done anything along those lines and you not see the marketing of long-term saving

sumers in very high efficiency appliances as haps being one aspect of persuading people to : electrically rather than by gas?

Mr. Hastings: It is difficult to answer that . I think probably we need to be more ressive in this area in working with the nufacturers to get more energy-efficient appli- es, but I think the answer is really going to lie h the manufacturers to some extent and how y program things, and their competition.

Everybody thinks the Smart House is going to the future; the Japanese are already on to it re so than the Americans in this situation. ery indicator would point to the Smart House ng the ultimate technology in energy savings, we all thought that when we had heat pumps air-conditioners installed, because they run separate systems to some extent, and there not that much in savings from an energy ciency viewpoint. While right now the Smart use technology is being hailed as the ultimate er of electrical power, it may not turn out to be

Mrs. Sullivan: I want to follow up on some of questioning Mrs. Grier started. I am interest- in the kinds of marketing programs you are ng now. What is your current marketing ition in terms of encouraging or discouraging ctrical use?

Mr. Hastings: We certainly use, through our ctric Letter, tips on trying to be more energy cient, pointing out that staff is available, nin the limited resources we have, for sultation in this area. We use direct telephone tact. Generally, I think we are more aggres- than we used to be in this area simply ause of external competitive forces, but also I nk probably because Ontario Hydro itself ame more aggressively marketing oriented in stance, until its name was changed in the rketing area to energy management, I believe, ich would suggest by name–if we only use ne alone–that there may be a little drawback eing as aggressive as we believe we ought to

Mrs. Sullivan: Through your advertising icies, are you attempting to increase market re?

Mr. Hastings: We would like to, but I do not nk we can realistically do so to any great extent ause of the leashes on us and because of the t factors, with gas beating us in many areas, l also because of the very nature of our anization. We are not generally aggressively rketing oriented. We are moving in that direction, but it takes time to get people to think more like a gas company, if you want to use that model, than we are.

That is why I am advocating that perhaps the committee needs to look at ways of getting people who are in the marketing area more aggressive than they already are in terms of trying to be energy efficient, in terms of putting on more seminars for different types of customers.

Mrs. Sullivan: To a certain extent in your advertising program, then, there may be a dichotomy between really encouraging people to use electricity and encouraging them to use it efficiently. I gather that is what you are saying.

Mr. Hastings: There has always been that dichotomy, I think.

1100

Mrs. Sullivan: How do you train your people in demand management approaches? Do you rely on Ontario Hydro to provide the seminars and the training that your people can take advantage of, or do you have internal programs and so on?

Mr. Hastings: Essentially, we are like the other utilities. We rely upon the leadership of Ontario Hydro, although we do have a customer service program that we have developed in conjunction with the private sector to make people more customer-oriented and customer-aware than they were, so that you do not get answers like, "That is basically the customer's problem." We are getting away from that type of outlook, which we still have in our own operation.

It takes a long time to change that–10 years, maybe. That is why we also presented in here that if there are certain surpluses of manpower/womanpower at Ontario Hydro in certain areas, and if the demand initiatives are going to be a strong operational reality, maybe we need to look at taking some of these people and placing them into a utility like ours, even though we do have a marketing department. Some utilities have none; no marketing at all. Yet the paper says the utilities are going to be fundamentally essential partners to get this job done, but they do not have any marketing expertise.

In a lot of the smaller and medium-sized ones, there may be one person or two at the most. They may wear a marketing hat two days a week but they are meter readers as well. In some of the smaller utilities, there is no strong marketing orientation. That one person you look at is the marketing person. They just do not have it. They

would like to have it but with their manpower/womanpower, they have to look at costs.

Mrs. Sullivan: Then in the long run, basically, your experience so far is that you have not been involved in your own, for example, energy audits with industry. You are leaving that pretty much to Ontario Hydro.

Mr. Hastings: We have done some energy audits, but again the lead has traditionally come from Ontario Hydro.

Mr. Runciman: I would like to follow up on one of the comments you made that you would like to increase your market share. What is the thinking behind that? It seems to go against the grain of what we have been hearing in the last number of weeks in terms of increasing consumption. What you are saying is that you would like to encourage increased consumption?

Mr. Hastings: Increased consumption, but used wisely.

Mr. Runciman: Why would you like to do that? What is the rationale of the utility in terms of wanting to increase your market share?

Mr. Hastings: Primarily the rationale is that if we had more customers, if we had more people using electrical power efficiently, even on the efficiency scale, we would end up with a few more dollars with which we can speed up our major plant conversion program, for one thing. There is that type of thinking behind that thought in the presentation of market share.

Mr. Runciman: Who sets the rates in your utility? You are purchasing it from Hydro at a set rate and the utility itself sets its own rates within the community. Is that not the way it works?

Mr. Hastings: The professional staff makes the recommendations in terms of its budget. We approve. You have the Ontario Hydro rate. Then you have a very small, narrow, 10 to 15 per cent of expenditures that you are going to be making yourself in terms of whether you are going to hire another marketing person or another distribution design engineer. Are you going to spend some more money on plant capacity or replacement? You have to add your rate on top of that, which will be two points or less.

Mr. Runciman: Are you limited by statute in respect to the kind of rate you can set?

Mr. Hastings: Yes, we are limited by statute because if Ontario Hydro rates this year are, say, five per cent and we come along and the staff approves a rate increase of, say, 6.1 per cent for our own specific purposes, there is a range, I understand, by which the volume of sales and all the other figures that go into the formula have be approved again by Ontario Hydro.

Let's argue that the 6.1 per cent–1.1 per c above the five per cent–is too much. They c come back and say, "Gentlemen, you are goi to have to make some adjustments in this are So we could end up with maybe 5.8 or 5.85 cent.

Mr. Runciman: Has that ever happened?

Mr. Hastings: Not yet, to my knowledge, I think it has happened in some utilities.

Mr. Runciman: I am wondering why a util could not, for example, add a 0.5 increase build up a fund to cover the rehabilitation rat than simply trying to increase consumpti through increased market share. We had a c in here last week who felt quite strongly that only way you are really going to have an imp on demand is to do it through the rate structu financial incentives to reduce demand are really going to have that much of an impact. was very strongly in support of doing someth with the rates. It strikes me as certainly the m effective and promptest way in terms of imp ing on all consumers across the board. I gat you have some views on that which would no too supportive of it.

Mr. Hastings: I can see where that thinkin coming from, but I think you have to consi also that if you were going to go with the increase predominantly to do all of your fina ing, you would be asking today's consumer pay up front, pretty well, for that plant repair rehabilitation or plant capacity expansion today's dollars, when there are going to benefits from the improvements down the roa customers who have not even come into y jurisdiction yet.

Mr. Runciman: What kind of debt load d your utility have?

Mr. Hastings: Right now, our debt loa zero, but that in itself is an indicator, I belie that we did not plan our debt creatively over last 20 years or so. As the plant has aged–an our instance some of the plant in certain part the city is probably 45 or 50 years old–it has beyond the normal life cycle. We did not h any debt incurred and everybody was saying it is fine. When you do not have to g debenturing you do not waste money, in esse but at the same time you are not planning fo future. We will have some small debenturing the first time in 20 years in the coming budge year if Metro approves the debenturing we about to present.

ʌr. **Runciman:** You are very pro-supply side your submission here. I guess you did not ke any reference to the Ontario Hydro debt. I her that is not a major concern of your utility, ike other utilities. I know North York has n very vocal about the Hydro debt situation. hat not a concern of yours?

ʌr. **Hastings:** Yes, it is a concern of ours, but in I believe it has to be placed in some spective. While there is some merit in the proach taken by North York Hydro, which ould be seriously looked at and even tried, our n outlook is that when people rate their ferences in customer surveys, they are look- at reliable, economically priced, safe power. at is not to say they are not concerned about ot, but it is usually about fourth or fifth in their ferences. Hardly ever have I seen a preference ning back where debt was number one.

While we have some concerns about it and it ould be kept under some control, more so now believe that we have to be providing the vice and the product to the customers or those stomers will get pretty angry pretty fast. They em to get even angrier and more demanding n they used to get.

Mr. Runciman: As a final comment, I had me difficulty with your position with respect to rchases. I appreciate where you are coming om, and that is a pretty commonly held ntiment right across the country, regrettably I nk, in terms of not looking at it as one risdiction, one country, rather than as 10 parate jurisdictions on a competitive footing.

The international body–I am not sure whether is called the Organization for Economic o-operation and Development–just commented the fact that we have simply too many ovincial barriers in this country. Perhaps we ould take a broader outlook in terms of looking it as one country rather than as different risdictions that are going to put the shaft to each her whenever they have an opportunity.

10

Mrs. LeBourdais: I am wondering whether obicoke Hydro has any specific policy with gard to secondary uses of the Hydro right of ay. I am thinking of such things as victory rdens–although I think there is another name r victory gardens these days–and that kind of ing.

Mr. Hastings: In fact, in one of the major nes that goes through our city right down to iagara, certain portions of the land are already used by people in the community for gardening and that sort of thing.

Mrs. LeBourdais: Do you do anything to make the public aware you are open to that kind of secondary use?

Mr. Hastings: In point of fact, the lands under the major transmission lines are owned by Ontario Hydro and any gardening plots in the city of Etobicoke that I am familiar with are administered by the city itself. It is the city's parks and recreation department that makes people aware that in a given area or neighbourhood there are plots available at X dollars for Y months. We are not really directly involved in that area.

Mrs. LeBourdais: Second, in the spring or early summer months when you are spraying for weeds, etc., again in those Hydro rights of way, what do you do to communicate to people in the residential housing that borders the right of way?

Mr. Hastings: I may be mistaken in this situation–and I do not want to give you the impression I am trying to be evasive–but again I believe the weed control is done jointly with Ontario Hydro and a given city's parks and recreation department. It is probably contracted out. We do not have any direct impact in this area. We have never had a program where we went to the public or said anything in our Electric Letter about the types of herbicides or pesticides that are legally and environmentally used by that contractor.

Mrs. LeBourdais: Earlier this year I did have an incident of a mother with a brand-new infant who had been put out in a carriage in the backyard, again adjacent to a Hydro right of way. She came out and found the spraying was going on and phoned very quickly and was very concerned about this kind of thing. You were the person I called at that point, but I am just wondering, is that not normally under your jurisdiction?

Mr. Hastings: You make a good point that perhaps we as a utility should be doing some communicating with our customers about the types of herbicides and pesticides that are being used and telling them to keep their children inside at a given point in time when this is going on. We could do that. But I do not think we have a direct influence or that we can get involved in saying, "You shouldn't be doing this or that." We could certainly publicize this situation in our Electric Letter to our customers.

Mr. Matrundola: On page 16 of your report you do make a mention that the select committee

should perhaps have a very thorough study of privatization of Ontario Hydro, that we should be conducting something in that sector. I would like to know your brief point of view of government-owned Ontario Hydro vis-à-vis privately owned Ontario Hydro, if you can give us some ideas.

Mr. Hastings: I think I understand your inquiry.

Mr. Matrundola: The pluses and minuses.

Mr. Hastings: Probably the minus side of any small degree of privatization is that the argument would probably run that the people already own the facility so there is no sense in expending any dollars on something you already own. On the other side of the coin, if you and I own a given portion of this entity, what is it? Can we go and point to a room that we own on the tenth floor at Hydro Place or say that you own a certain number of circuits of North York Hydro, or what have you?

Mr. Matrundola: In your opinion, would the public at large benefit if Ontario Hydro was privately owned? Would there be a great saving to the public at large? Would it be in the best interest of the public to have it privately owned?

Mr. Hastings: In our estimation, a totally privatized Ontario Hydro is unrealistic. I think there may be some areas of possible privatization within Ontario Hydro. What they are I am not exactly certain, but it might be a question worth some exploration, to get the viewpoint of the people across the way, to see if there could not maybe be a pilot project tried on a small activity to find out the minuses and pluses of some privatization. If it turned out that there were more minuses and more difficulties than the other way, then it would give you a pretty good idea that the beast we have is the beast we know.

Mr. Chairman: We are just about out of time. Mrs. Grier, do you have a very brief question?

Mrs. Grier: Mr. Hastings's use of the phrase "manpower/womanpower" reminded me that I do not think I have ever seen a woman in an Etobicoke Hydro uniform. Do you have employment equity policies?

Mr. Hastings: Not only do we have them by legislation but we had them long before the legislation and, yes, we do have two linepersons in our utility right now.

Mrs. Grier: And how many meter readers?

Mr. Hastings: I guess approximately a dozen, and I think there is probably at least one woman in that area, so they are moving into this.

Mr. Chairman: Mrs. Sullivan, did you ha brief question on DSPS?

Mrs. Sullivan: Yes. This is supplementar Mr. Matrundola's question about privatizati If you are a proponent of privatization for part Ontario Hydro, would you also be a proponen privatization for parts of Etobicoke Hydro?

Mr. Hastings: Absolutely.

Mr. Chairman: Mr. Hastings, on behalf the committee I would like to thank you coming in and appearing before us. I think can tell by the questions that you got the attent of the committee. We very much appreciated coming forward and speaking with us today.

Mr. Hastings: Thank you very much for opportunity.

Mr. Chairman: I wonder if I could ask next witnesses to come forward: Mr. Reco and Mr. Reid from the Ontario Metis Aboriginal Association. Mr. Recollet is rep senting the association, along with Mr. Reid, legal co-ordinator. The committee has b given a copy just now of their presentation. Recollet, I wonder if I could turn the floor ove you. Perhaps you just might very briefly expl what your association is, although I think name is fairly self-explanatory. Then we co let you go on with your presentation.

ONTARIO METIS AND ABORIGINAL ASSOCIATION

Mr. Recollet: I would like to, first, put words in some formal context, so I could read the delegation that is here because many tim being a native politician, people find long-winded. If you will bear with me, I thin bit of the history has been explained within brief. When I look around the table here, I do recall some of the MPPs from various politi organizations in Ontario here. A lot of the fa here are new, even though I have had opportunity to appear before other committee

The Ontario Metis and Non-Status Ind Association was formed in 1971 to represent political, cultural, social and economic intere of the Metis and nonstatus people in Ontar With changes to the Indian Act in 1985, many OMNSIA's members became status Indians continued to express the view that OMNSIA b represented their interests. As a result, OM SIA's membership rules changed to allow f membership to any aboriginal person, meani Indian, Metis or Inuit, except band memb residing on reserves. To reflect this chan

NSIA changed its name in July 1987 to the tario Metis and Aboriginal Association.

OMAA is an umbrella organization composed five affiliated regional associations or zones. ch zone organization has its own political ucture, executives and board of directors. The ee executive officers of each zone, together h OMAA's three executive officers, make up IAA's 18-member board of directors.

20

Within each zone are local associations iliated both with the zone organization and h OMAA, which is a province-wide organiza-n, directly. In all, OMAA is a federation of) locals, representing 200,000-plus off-erve aboriginal peoples in approximately 115 nmunities across Ontario. Our members are tis, Cree, Ojibway, Mohawk, Odawa, Onei-Mississauga, Seneca, Tuscarora and others.

OMAA exists to give expression to our nstituents' desire to govern themselves, within context of the Canadian federation. There are parallel processes involved in the movement vards aboriginal self-government: constitu-nal reform and trilateral negotiations. I will efly describe these two processes in turn.

In 1982, Canada's Constitution was amended include a provision for aboriginal peoples to gotiate our way into Confederation. In March last year, the series of first ministers' nferences required by the 1982 Constitution t came to an end. As you know, the cussions ended in failure. The first ministers used, after five difficult, frustrating years of gotiations, to recognize that aboriginal peo-s, like all peoples, have the inherent right to vern themselves. Since then, the agenda for original constitutional reform has been aban-ned by the nonaboriginal governments and, ng with it, our hopes for a place in Confedera-n.

Our forefathers governed themselves, and ther they nor we have given up that right. Nor it been extinguished in any other way. It is a ht given to us by our Creator, to all our people, all time, and belongs to our children as much to our elders. It cannot, therefore, be rendered by us or taken away. It is an inherent ht.

As we have said many times before, our irations do not pose a threat to Canadian nfederation. Rather, we seek to complete the cle of Confederation and to thereby strengthen nfederation. Our people have always shared land and its resources with non-natives. We that we be recognized, along with the French and the English, as the first founding peoples of Canada and Ontario.

At the March 1987 first ministers' conference, Premier Peterson said: "Today no responsible Canadian accepts the notion that one people should exercise power over another to the extent that that power has been exercised over aboriginal peoples. At the very least, it is an affront to our democratic tradition" and "The government which I represent will continue to make every effort to achieve self-government. We are committed to self-government and we are determined to make it a reality."

In the absence of constitutional recognition of our right to self-government, some of my people have told me that I should not attempt to negotiate for self-government. Without constitutional protection for aboriginal peoples, they say, governments cannot be trusted to negotiate in good faith. Nevertheless, we at OMAA have decided to sit down with the federal and provincial governments to attempt, in good faith, to negotiate a framework agreement for the negotiation of self-government for aboriginal people living off reserve in Ontario. We are committed to building a new era of trust and co-operation between aboriginal and nonaboriginal peoples.

A vital first step towards self-government is the signing of a province-wide, tripartite framework agreement in which the parties, OMAA and the federal and provincial governments, undertake to negotiate on priority agenda items with the objective of reaching agreement on those issues within flexible time frames. Many of the problems related to the lack of a constitutional amendment on self-government could be resolved by a framework agreement. When, and only when, a framework agreement is reached, OMAA and its communities will be in a position to prepare to negotiate self-government agreements at the provincial, local and regional levels.

What does self-government mean for off-reserve aboriginal peoples? We foresee and aspire to various levels of aboriginal government, from the provincial to local and regional governments. At the local and regional levels, we envision various forms of self-government, each appropriate for a different aboriginal community. Obviously, therefore, tripartite negotiations are necessary at the province-wide level and at the local and regional levels.

In a framework agreement, we propose that the Ontario Metis and Aboriginal Association and the federal and provincial governments agree to negotiate with the objective of reaching

agreement within flexible time frames on the constitutional status, powers and jurisdictions of aboriginal governments over an agreed-to list of matters. From such a list would be chosen a shorter list of priority agenda items, including, for example, economic development, lands and resources, social services and the powers and constitutional status of aboriginal governments. A framework agreement would also describe a process for negotiations and include a general description of the structure and role of a negotiations secretariat. This would be a high-level steering committee and tripartite technical working groups for specific agenda items.

Such an agreement would not, in itself, affect, create or define any rights or powers that any of the parties now claim and would be without prejudice to any other discussions–an example is a constitutional reform–concerning aboriginal self-government. It would merely be a commitment by all three parties to negotiate in good faith, with the objective of reaching agreements on issues of vital concern to aboriginal peoples.

Our objective is to gain, through serious, orderly negotiations, greater control over the matters that most affect the lives of aboriginal peoples, so that we will survive and grow as distinct, self-reliant peoples.

Our cultural and economic survival depends upon strengthening our peoples' unique relationship to the land, including its resources and jurisdiction over those resources. OMAA's constituents currently have no land base. We therefore require the establishment of land bases and various types of control over wildlife and resources.

Our children are still the victims of an inappropriate, ineffective education system, which results in the alarmingly high dropout rates. Like parents everywhere, our people want to determine how our children are educated.

Aboriginal peoples and communities suffer from high rates of alcoholism and drug abuse and constitute a disproportionately large percentage of the prison inmate population. Existing policies, services and institutions are not designed to meet the needs of aboriginal peoples, because they are not designed by aboriginal people. We must be directly involved in designing and operating social services and justice systems for our people.

Our traditional economies have, to a large extent, been eroded. Our communities must have the tools to create economic opportunities for aboriginal peoples so that we may become both economically and politically self-reliant. Economic development and self-government hand in hand.

It is critically important for this committe understand that self-government negotiati between OMAA and its communities, and governments of Canada and Ontario, have yet begun. To date, Ontario has refused to sig framework agreement to begin negotiations, do OMAA's communities have access to forum for the negotiation or settlement of l claims based on their treaty and aboriginal rig The existing forums are available only to ba registered under the Indian Act, which i federal responsibility. The majority of aborig peoples–OMAA's people–are not represer by registered bands. We are the forgotten peo

OMAA's people and communities are de mined to strengthen their special relationshi the land and its resources. Energy issues, the l and its resources are inextricably linked. Ene issues are, therefore, of unique and fundame importance to OMAA's people and are clo linked to constitutional issues, economic de opment, land management and aboriginal rig

We are not opposed to energy projects make use of our land and its resources. We however, insist that development on our tr tional lands can proceed only with the participation of aboriginal peoples and t governments at every stage and level of decis making. History has taught us that our pe should never be the losers in any developn projects initiated and implemented by n natives. We seek a new relationship non-native governments and authorities, thro which development projects can be planned implemented for the benefit of all of Ontar people, native and non-native.

Let me give you just one more recent exan of the problems caused by the lack of aborig control over decisions involving the use of la Ontario Hydro proposes to construct a hydroe tric generating station at Little Jackfish Ri north of Lake Nipigon. If the Little Jack River project is approved, it will see construction of two hydroelectric dams on Little Jackfish River, about 7.9 and 12.5 m from the mouth of the river.

1130

When completed, the project will result in flooding of a large area of land in the Mo Lake area. It will displace a large numbe native trappers and hunters in the region. only will these people lose their ancestral l base to the flooding, they will receive absolu no material or economic benefit in return.

nerating station will be completely automated, oviding no long-term employment for the gion. Even during construction of the dam, it is icipated that virtually no aboriginal people ll be employed. Construction jobs will go to lled workers from outside the region: Mani- ba, Quebec.

For the duration of the construction phase, our nmunities in the region will be disrupted by influx of approximately 800 non-native rkers into the area. History has shown us that can expect great disruption to the social and tural fabric of our communities when our ople become minorities in their own country d province.

True, some effort has been made by Hydro to ermine the extent to which native communi- s and their cultural and economic pursuits will damaged by the proposed project. An ployee of Hydro has visited communities of ive people living on reserve in the vicinity of project. It is very important for this commit- and Hydro, however, to realize that the jority of aboriginal people in the vicinity of project do not live on reserves and are not resented by band councils or registered tribal uncils.

OMAA's communities and members are not istered or recognized under the Indian Act or y other statute. They have no offices, no staff, paid leaders and no resources with which to ain expert assistance in any matter. Despite MAA's request, Hydro did not provide OMAA its affiliated communities with any resources h which to retain expert assistance to examine potential effects of the proposed projects on r communities.

To date, therefore, there is no reliable ormation on how the fishing, hunting, trap- g or other resource harvesting rights of MAA's people will be affected by the project. member that I am speaking not merely of nomic interests but of rights which arise from r people's occupation and use of the land from e immemorial, rights which have never been inguished and are now, since 1982, en- nched in the Canadian Constitution.

Our people ask themselves: "How can Hydro, posedly under the control of the government Ontario, even contemplate a project which l, in all likelihood, attack the fundamental nstitutional rights of the original peoples of s province?"

Sadly, Little Jackfish is not the exception but rule. The non-native governments continue to tinely ignore and violate our rights, usually unnecessarily. Our people note that a huge deposit of peat is known to exist near Upsala, a short distance from the location of the proposed Little Jackfish project. They wonder why the peat deposit could not be used to generate electricity, an alternative which would create long-term, much-needed employment in the area and which would be far less disruptive to the environment.

I would be remiss if I did not address the issue of energy prices. This is a matter of particular importance to OMAA's northern Ontario communities. High heating costs exacerbate an already poor housing situation. Poor housing is a principal cause of many of the critical health problems facing our people.

Economic development and self-determination for OMAA's communities are closely linked. A key element of our communities' economic development strategy is the expansion of the aboriginal tourism industry. Unfortunately, high gasoline and other fuel prices deter many potential American tourists from visiting northern Ontario and employing the services of native businesses. As well, higher heating and lighting costs, which must be passed on to customers, make it difficult for Ontario's native-owned tourism enterprises to compete with the US tourism industry.

Inasmuch as housing and economic development are two vital matters over which aboriginal peoples seek to exercise self-government, OMAA's people must be full participants on all those bodies which determine energy pricing policies and set energy prices. We believe it is also reasonable to expect that a portion of all revenues from energy sales will be returned to aboriginal communities in order to finance the administration of institutions of self-government.

We are not asking for handouts, nor are we claiming exclusive jurisdiction over all of Ontario's lands. You must remember, however, that we have never surrendered our right to self-government nor have we ever surrendered our rights to harvest the resources of the land. These are therefore existing aboriginal rights which were entrenched in the Canadian Constitution in 1982. We believe that the land belongs not to us but to future generations. It is not ours to give away or to destroy.

We insist that aboriginal communities and their governments should decide, in consultation with non-native governments and their agencies, how our lands will be used. We insist on participating in planning and managing any

projects which may have an impact on the environment and the way of life of our people.

There are ways in which our concerns can and must be addressed. The first and most important way is by the commencement of formal tripartite negotiations between OMAA and the governments of Canada and Ontario on self-government for aboriginal people living off reserve in Ontario. A forum and process must also be established for the negotiation of land claims by OMAA's constituents.

As an interim and partial alternative, the Legislature could enact legislation requiring that any major project requiring the use of land, whether private or public, be subject to the approval of community-based lands and resources management authorities.

Such authorities should include democratically elected representatives of the community, representatives of the government of Ontario and representatives from the private sector. Aboriginal peoples should be guaranteed significant representation on such authorities. The consent of the community representatives would be required for the approval of major development projects. Aboriginal peoples should also be assured of significant participation in those agencies and boards which determine energy pricing in Ontario.

We believe that communities should be entrusted to make decisions regarding economic development and land use, which will be in the long term interest of people. We believe that our proposal is fundamentally more democratic than the current system which provides for only token input by our people into decisions which vitally affect them. OMAA is, as always, prepared to enter into serious negotiations on any or all of these matters.

Thank you for your time. I look forward to your questions or comments.

Mr. Brown: Looking around, I believe I am the only northern member here at this time. I appreciate your bringing forward your concerns. In my riding we have not only a number of status reserves, but we also have obviously a large number of native and Metis people who do not live on reserves. So I am very sensitive to the kinds of concerns you are raising today.

I think that it is also very important to recognize the difficulties in the hydroelectric development area, particularly in the north. We as northerners have many concerns about our environment and how hydroelectric facilities will affect them.

I was interested in the process. Obviously y talked about Little Jackfish River and t process. But in the past, what has been process? Could you tell me what kind of in your organization has had, as well as other nat groups, into Ontario Hydro? I suspect they l environmental hearings. What type of interv tion were you able to make?

Mr. Recollet: With reference to the megap jects, such as the Ontario Hydro's Jackfish La project, I have had an opportunity to down–you call it a consultation process–w some of our leaders up in that area from various locals, such as the Armstrong Me Association, Hector King, and Mr. Patie from the Collins area and other surround Metis communities up in that area.

Basically that is pretty well all it was. It wa gathering to have very limited input into exac what goes on. We are not really part of t decision-making, even though they sat a listened to us. Our people were not appointed any boards of any stature or nature which hav direct effect on the Little Jackfish Lake proje In our brief, OMAA's brief, that is what we looking for.

1140

They are virtually going to go into an area northwestern Ontario, or even some other par Ontario, where our constituents are forgot people. For whatever reason, for the past years whatever level of government or whate party tried to assimilate us into the mainstrean society. Our people today have an opportun in this generation and for future generations establish adhesion to treaties, of people who h identified themselves through their birthri with a relationship to the land. In other wor the development of these huge megaproje destroys our chances for any current and fut land claims, destroys our chances to become p of the treaty we once belonged to, which w written by both levels of government and crown.

Basically, other than with this Little Jackf Lake hydro project, we had little or no partici tion in my term here as president in Ontario.

Mr. Brown: Maybe this is not quite fair, in most areas of northern Ontario, most of critical areas where we were looking at wa sheds, it seems to me there exist native la claims of one kind or another. Anyway, there some land claims under dispute, many of th being actively pursued now by the province the federal government in terms of resoluti probably not actively enough, but at least t

moving. In most cases, a particular band or ›up of reserves that are party to a particular ıty are involved. In that particular process, w do the bands work you into the scheme of ıgs? Do they attempt to allow you to make ır representations along with them?

Mr. Recollet: To date, we have had some operation. I can make reference only to this specific project at this point in time. There s some consultation with the Whitesand band towards Armstrong in the regions that I have n to, but since then I cannot speak for the tus Indians living on reserves. They have their n status in the political system. We have very le contact, because the group they represent is ely identifiable by the Indian Act, which is a eral responsibility. Even though we are king attempts to work alongside our brothers l sisters, we do find it very difficult. Maybe lawyer here, Chris Reid, can elaborate a little re on constitutional issues.

Mr. Reid: The bands do not represent our ople in land claims, to put it simply. In fact, n if they wanted to, they could not. The land ims processes that exist are strictly for the use bands registered under the Indian Act. Those ıds represent approximately one third of the ive people in Ontario. The other two thirds are resented by OMAA. There is no forum that people have access to. The province will not gotiate land claims unless the federal govern- nt is involved in negotiations, and the federal vernment takes the position that only status lians have treaty or aboriginal rights, so we are ıply shut out of the process by both govern- nts. Our land claims are not being addressed any forum at the moment.

Mr. Brown: To follow on that: what is their tude, though? Are the bands supporting you in ır quest to become represented in this system?

Mr. Reid: They have limited resources and required to represent their people.

Mr. Brown: I did not mean that. Politically, they attempting to include you in the process? id not mean actually representing your view, rather taking the position that you should be luded in the process.

Mr. Recollet: As far as dealing with the rent level of government is concerned, we are rking with the Office Responsible for Native fairs and hope to see their version of a land ims policy. We want to ensure that our needs r met. We keep stressing to the people within office of native affairs that, other than being ognized in the Canadian Constitution of 1982, we are not governed by the Indian Act or any other piece of legislation.

We find it very difficult in dealing with our brothers here in Ontario. We have a lot of examples across Ontario in dealing with land claims issues. Under Bill C-31, some of our people can be reinstated as eligible to live on reserves. However, our members are having a difficult time in trying to get themselves reinstated, as Chris mentioned, because the reserve land base may be too small and because of limited resources financially and their limited infrastructure on reserves.

If that is an indication of how well they are going to work towards land claims, unless there is more political commitment by both levels of government–I think that is the problem right now. Are the federal government and the province prepared to commit and sit down seriously to negotiate a lands claim policy, for not only our status Indian brothers and sisters but also for the Metis and the aboriginal people living off the reserve?

Mr. Reid: Bands simply cannot make it a priority. The ones that have taken a position on our concerns, whether tribal councils, grand councils or individual bands, have, for the most part, supported us, but they tell us they cannot make it a priority. They cannot afford to. Their priority is representing their people, band members. In fact, there are a lot of cases where simply by law or by policy they could not represent our interests if they wanted to. Even if they could, our people have no part in choosing the leadership of bands or grand councils, so we still would not be represented in those forums.

Mr. Brown: I guess right now we are talking mostly about generation, but there is also the question of hydro power lines which may have to be extended between northeastern and northwestern Ontario, for example. Do you have any specific concerns about hydro rights of way on crown land, etc.?

Mr. Recollet: I think I mentioned in my brief that I am a politician. I am not an expert. I have not worked for Hydro in the past 20 years and I do not intend to. I am telling you exactly what has happened within those areas and what our people are looking for. Now, if we were part of those boards in the planning process and the decision-making process right from the initial stages, I am sure we could have people sitting here today to answer your questions of that nature.

Mrs. Grier: Mr. Recollet, I am one of those for whom your presentation is a new one, and I appreciate the background and the history that

you have given us. Let me say that I fully support the kinds of requests you are making, but what I would like to try to understand are the inadequacies of the present mechanisms for involving you in the decision-making about something like Little Jackfish. I assume that under the Environmental Assessment Act that project would be subjected to an environmental assessment hearing. Have you any experience in playing a part in those kinds of hearings, or do you feel excluded from that specific process?

Mr. Recollet: I will comment on it very briefly and I will again ask Mr. Reid to comment. I think we are involved in the environmental hearings, timber management hearings, to a very limited extent. We are sitting there as a province-wide organization. As I say, there is about $100,000 to divide up among four aboriginal organizations, and our association gets $29,000. We have to hire some management people to review anywhere between a 4,000- to 10,000-page document that is going to be piled about this high. By the time we pay those experts to review the material and find out exactly what sections pertain to our aboriginal people, the $29,000 is a piss in the ocean. It does not go far enough. It is tokenism. They are saying you can participate, but can we really participate with $29,000? Yet we are up against a ministry that has I do not know what kind of budget. I think we talking into the hundreds of millions of dollars as far as running for one year. At the same time, the people who are affected in dealing with these types of projects are the people at the grass roots, at the community level, who have no input.

As another good example, if I can get off the topic a bit, you are preparing a report on energy. We were concerned about the final report and recommendations of the Royal Commission on the Northern Environment. The chairman was Mr. Fahlgren. I had an opportunity to read the report. We had some consultation in the initial stages, but at the end, when we saw the recommendations, it was all geared towards Indian communities, Indians governed by the Indian Act, which we do not appreciate with our constituency base. I personally feel the numbers are much greater than those living on the reserve. We hope that whatever comes out of this report, our association and our input is exactly as we are presenting it here today.

Mr. Reid: If I can just expand a bit on what Mr. Recollet said, with respect to the Little Jackfish project, no environmental assessment hearing has been ordered yet. We have certainly requested one, but even if a hearing is ordered, as Mr. Recollet said, there is the question participation in the hearings. Without adequ resources, our people cannot really participa

The timber management hearings are example. Out of a total of $300,000, OMAA awarded around $29,000. This is for a hear that will take about two years. The money already gone and the hearings are not even quarter of the way through. After a couple of t to the hearings by the lawyer representing us, money was gone. So it will not be enough, eve were on the same scale. That is essential.

1150

As far as consultation is concerned up u now, again, to use Little Jackfish as an exam Hydro, of course, has done its internal envi mental assessment. It is a huge book, a h mass of paper. We have nobody, even at OM head office, who is really competent to c ment. We do not have any engineers on staff. do not have environmental experts. It is lef somebody like myself, in consultation with executives, to review that material.

That is at head office. Outside of head off our communities have no resources, no offi no staff whatsoever. If a Hydro official goe one of our communities, he will meet the l president in his or her home. The local presi will say: "I have a grade 8 education. I d know what any of this is about." They will even comment on it. Even if it is a good proj they will oppose it because they do not un stand it and they have not had any input developing the plan. Again, Little Jackfis probably a good example of that.

Even if an environmental assessment hea is ordered, again our concern would be although it does provide for some input–reall is a process of consultation with the commun there is no guarantee that local people are g to be on the panel which is appointed. There i guarantee that our people or any local people have a direct role in making a decision a whether the project goes ahead.

Mrs. Grier: Is such a project in any compatible with your aims and objectives long-term attitude towards the land? Will the twain meet, or is it irreconcilable?

Mr. Recollet: If you look at the thrust o presentation, everything we do in Ontari geared toward the right to aboriginal government and our relationship to the land. made reference to hunting, fishing and trap whatever the province and whichever gov ment was in power for the past 200 or 300 y

is currently in power, its decisions will have a ect effect on us.

To ensure that our needs are met, as menned, we are pursuing different tracks. One is constitutional reform called the political ocess, and the other is the trilateral process. On ier issues, we are prepared to sit down as long we are involved in the planning stages right at beginning. There is a board with authorizan involving our people to have a direct input o whatever policy is being set or whatever ection any new project will be going. All sides ll be heard.

Mrs. Grier: You made reference to the high st of energy in the northern communities and remote communities. I assume that high cost to a large extent determined by the need to ng in diesel oil and gasoline to run the nerators that provide the energy. They are ostly diesel-powered, small-scale generators u are talking about.

Mr. Recollet: Basically, in reference to our esentation, that would be also high cost, but we making reference in general to the high ating costs in northern Ontario.

Mrs. Grier: Has Hydro ever taken any tiatives or explored with you the possibility of ernate forms of generation, the more passive d sustainable resources energy such as wind or lar or small-scale hydro which would merely ve a smaller remote area?

Mr. Recollet: Not to my knowledge. That rticular area has never been explored. As we ention in our brief, we have areas of peat up ere which could be an alternate source of ergy for people in that area.

Mrs. Grier: But that has never been suggest-.

Mr. Recollet: We are working on that now rough our economic development corporation. e are looking at it, but it has never been plored with Ontario Hydro, for example.

Mr. Reid: We do not have any expertise in is matter. Our people tell us that generation om peat would be clean. It does produce some noke, but not sulphur-producing smoke. We do ot know. We are not saying that is the ternative, but we would like it to be studied. ur people would insist, for example, that at ast there would be a serious look at whether this a good alternative to the Little Jackfish project.

Mrs. Grier: Hydro has never done a feasibili- study of that, that you are aware of.

Mr. Reid: Not as far as we know, not to our nowledge.

Mr. McGuigan: Mr. Recollet, I represent an area in southwestern Ontario. I probably represent the ignorance that we have of your claims, and I just want to try and educate myself.

There is a reserve in my riding, the Moravian reserve–the Potawatami people, I believe they are, as I see you do not have them listed here. The simple way I see these people on their reserve, at least in my terms, is that they own the reserve. It is their land and they would have a deed, a piece of paper that says it is their land. When they move off the land, though, it strikes me that they are just like any other person of, I guess in your terms, a foreign population. They can take jobs and they can own land, which they would have to buy with currency and get a piece of paper for it.

How does that differ in the north with the people who leave the reserves and then move out on the land? Do they go out on what we would call crown land and establish a sort of ownership of that land? That is what I am confused about.

Mr. Recollet: I guess what you are saying is that when our people leave–

Mr. McGuigan: When they leave their reserve and they move out into where they do this hunting and trapping, how do they establish the ownership?

Mr. Recollet: As I mentioned in my brief, our association, the Ontario Metis and Aboriginal Association, represents the Metis and nonstatus Indians living off reserve and the newly acquired status Indians who are not yet fully reinstated on reserve. So as far as an Indian living on reserve and covered by the Indian Act is concerned, when he goes off reserve, it is pretty hard for me to tell exactly where he is going to go; what provincial park he will want to go hunt or fish and trap in, I do not know. I cannot speak for the status Indians on reserve. You are making reference to status Indians on reserve.

Mr. McGuigan: No. I am trying to define in my mind the status of an Indian when he is off the reserve.

Mr. Recollet: Okay. Status Indians off reserve, as far as I understand it, within their treaty area are eligible to hunt, fish and trap; but once they leave that area, I assume they relinquish that right. Maybe our lawyer can go into a little more detail.

Mr. Reid: Mr. McGuigan, our people, as well as many of the organizations of status Indians, have rejected, as we often say, so-called status and so-called nonstatus because we reject these distinctions that have been created by government. Our people never had anything to do with

writing an Indian Act or any of the Indian acts, which have had the effect of dividing our families. We take the position that a person who is descended from someone who has signed a treaty is entitled to all rights under that treaty whether or not he lives on reserve, whether or not he is registered under the Indian Act, so that many of our people are treaty Indians although they are not status under the Indian Act.

As Mr. Recollet said, it was never a term of any treaty that an Indian person or a mixed-blood person would have to live on reserve to exercise his rights under treaty or any rights that he never gave up under a treaty, like the right to self-government. So we take the position that it does not matter whether a person is living on reserve or not. In some cases they have been forced to leave the reserve because Indian agents working for the federal government have arbitrarily decided that they are not status Indians any more, so none of their descendants are. That is a large part of OMAA's constituency.

Mr. McGuigan: But that is being corrected, is it not?

Mr. Reid: No, or only to a very limited extent. The amendments to the Indian Act allow some people to regain status under the Indian Act. Even if they do regain status, many of them will not be able to live on reserve, because the reserve simply cannot accommodate them; or they will not be able to because they have simply lost touch with the reserve and they are part of an off-reserve native community, perhaps living in a city or somewhere else off the reserve.

We take the position that those people have never surrendered any of their rights. Those rights could be lost only if they were surrendered, and they were not by any of our people. All of our people either have treaty rights, or if they have never signed a treaty or their ancestors never signed a treaty, they have unextinguished aboriginal rights to the land and its resources and to self-government and everything that that encompasses.

1200

Mr. Chairman: Are there further questions from the committee?

Mrs. Grier: The constitutional amendment of 1982 that you mentioned–and I apologize for not understanding it more fully–does that accept your contention that there is no difference between what has been defined as a status native person and a nonstatus?

Mr. Recollet: You are referring to 1982?

Mrs. Grier: Yes.

Mr. Recollet: This is where we hav problem. We recognize the fact that we recognized within subsection 35(2); the def tion of an aboriginal person as Indian, Inui Metis. But at the same time we are sitting bac our aboriginal communities off reserve saying, for example in regard to the status of l base, the Inuits have land bases and infrastr tures on those land bases, but we are suppose be recognized equally in that particular sect and we do not have that opportunity.

Mrs. Grier: So the section makes no disti tion; it is merely in how they administer it?

Mr. Recollet: As far as I am concerned, are equal in that area; yet we do not have acces certain things which our status Indian and I brothers and sisters have.

Mr. Reid: In fact, part II of the Constitut Act, 1982, subsection 35(1) says, "The exist aboriginal and treaty rights of the aborigi peoples of Canada are hereby recognized affirmed." I think that is an exact quote. subsection 35(2), aboriginal peoples are defi as the Indian, Inuit and Metis peoples of Cana We take the position that that supports argument that our people are really in the sa position with respect to treaties and aborigi rights claims as any other aboriginal people.

Unfortunately, as Mr. Recollet said, constitutional amendment was vague enou when it said the existing aboriginal and tre rights are recognized and affirmed that gove ments have been allowed to take the position t nothing changed anyway. There were no exist rights for our people on that date, so noth changed. That is the position both governme take.

Mr. Chairman: Mr. Recollet, do you h any closing comments you wish to make?

Mr. Recollet: As I mentioned before, just not take the steps of the recommendations of final report from the Royal Commission on Northern Environment. When they did t report, they did consult with some of our peo up north, but when the final recommendati came out, they just made reference to India When they said Indians, I am not sure they me Indians covered by the Indian Act.

Our people do compose a large population Ontario. We have documentation from 1980 t the aboriginal people represent anywhere fr 15 per cent to 18 per cent of the population acr Canada. If you apply that figure here today–

claiming 200,000 plus, and I am sure that ure will be around 900,000.

All I am saying is, in the future, include us at very beginning of all negotiations and include on your boards, the final decision-makers, as exercise our determination towards aborigi- self-government, which hopefully this cur- t government and also the federal government er November will continue to pursue on behalf the aboriginal people of Ontario.

Mr. Chairman: Thank you, Mr. Recollet. On half of the committee, I would like to say how ch we appreciate your coming forward and king a presentation to us and bringing these jects to our attention.

For the benefit of the members of the nmittee, for this afternoon's session, the sentations of a number of the groups were sent us earlier, so you should have them in your ices. You might want to bring them with you en you come this afternoon. Mr. Richmond, you have a comment?

Mr. Richmond: My colleague Lewis Yeager s here last week. I was with the standing nmittee on resources development on truck- . I mentioned this to a number of members. I not see Mr. Runciman in the room but I ntioned it to some other members during our earlier hearings. We have prepared and distributed to you the summary that you have probably seen. Lewis and I have done a summary of the deputations. You may find that very useful. We have taken out of the DSPS report the 52 strategy element statements, and out of all the submissions, briefs and testimony we have received, out of that mountain of paper, quite literally, we have tried to extract the key points.

We have not passed value judgements on these points, but we have pulled them out of the deputations and related them to the best of our ability to each of the 52 strategy elements. In conversations I have had with the chairman–and I think I can speak for you, Mr. Chairman–we hope that document will serve as a valuable guide, an asset to the committee, when we get into our report-writing phase, because quite literally, unless we do that, there is just so much on the plate here. If you have concerns, look at the document. If you have questions, Lewis or I will be here to answer any of them. We will be updating that document to cover these last–what do we have now?–three more weeks of hearings.

Mr. Chairman: I will adjourn the committee until two o'clock this afternoon.

The committee recessed at 12:05 p.m.

AFTERNOON SITTING

The committee resumed at 2:10 p.m. in room 228.

Mr. Chairman: I call the afternoon session to order. Just before we get to our first witness, we have a little bit of committee business. On Friday, we are going to Elliot Lake. The committee has been granted full Hansard service, but I am wondering if it is really necessary to take Hansard and all of the paraphernalia to Elliot Lake with us in order to record the hearings. I sense the committee thinks that may not be best. Actually, there is a slight technical problem. There are not enough seats on the airplane to Elliot Lake to take everybody and Hansard.

Mr. Charlton: I do not really think it is necessary.

Mr. Chairman: Mr. Brown, do you have a motion?

Mr. Brown: Yes.

Mr. Chairman: Mr. Brown moves that the select committee on energy not take Hansard and the broadcast and recording service to Elliot Lake on Friday, September 23, 1988.

Mrs. Grier: Unless they definitely want to come.

Mr. Chairman: We will leave it open, if they would like.

All those in favour? Those opposed?

Motion agreed to.

Mr. Chairman: If we can move to the first witness of the afternoon, it is the Association of Major Power Consumers in Ontario. As I mentioned to the committee members this morning, they have submitted a brief to us prior to today's hearings, so you all will have that. Mr. Parker, I wonder if in the beginning you might introduce your panel to us and perhaps explain briefly what the association is. Then I will turn the floor over to you for your presentation.

ASSOCIATION OF MAJOR POWER CONSUMERS IN ONTARIO

Mr. Parker: I had planned to do that.

Mr. Chairman: Just for Hansard, perhaps you could indicate who is at the table.

Mr. Parker: Yes, I will do that in the process.

Mr. Chairman: Fine, then I will just turn the floor over. We will turn the air-conditioning off and get under way then.

Mr. Parker: Thank you. My name is T Parker. I am past chairman of the Associatio Major Power Consumers in Ontario. I am director of purchasing and government relat for Atlas Specialty Steels.

AMPCO is the Association of Major Po Consumers in Ontario and represents the lar electricity-consuming industries in the provi Among the primary objectives is the assura that there is a reliable supply of electricity. association consists of 62 members, the majo of whom directly serve customers of Ont Hydro. About 10 of our members rec supplies through a municipal utility.

A recent membership survey indicated some 200,000 people are directly employe these industries and at least a similar numbe the supply of services, etc., to them.

The present level of consumption is 20- per cent of Ontario Hydro's output. This fi continues to rise as we gain more members industry moves to newer electrotechnolog For example, the pulp and paper industr quickly moving to thermomechanical pulpin which point it becomes a major consume electricity.

Many of our members take interruptible po because of the price discount benefits of so where around 10 per cent. However, last m alone, some 37 to 40 plants were interrupte up to four days for as much as four hours time. Typically, in the case of Fiberglas Can an interruption of even a few minutes can n three to four days to recover full production

Every member has been minimally interru in the past four or five years, but 1988 has l the most serious. Applications by many of t companies are being made to revert to supply, but as you know, this can take up to years to be accommodated by Ontario Hydr

Conservation can be the answer to the he demand of last year and this year, but I sul that much of this has already been achieve industry. If, on the other hand, conserva simply means a reduction in usage, it may re in cutbacks of production at a time when market demand for Ontario goods has never l stronger.

You have already received AMPCO's brie demand-supply options, which is divided four sections. There is a summary and rec mendations, a detailed comment on Ont

lro's report 666SP, a paper on supply by the Keith Kidd and an analysis by Don Nevison.

would like to emphasize that AMPCO's cern is that we will run out of power by 1994.

would like to hand the remainder of this sentation over to two consultants for AMP-, Larratt Higgins, an economist on my nediate right, and Don Nevison, a consulting ineer, both of whom will address demand and ply in summary, after which we will address questions that you may have.

Ir. Higgins: My function in this presentation discuss the demand side of Ontario Hydro's nand-supply options study. My colleague Mr. vison will discuss the supply side.

MPCO's concerns on the demand side are efold. First, AMPCO thinks that the forecast oo low. Second, AMPCO is concerned that ecast error is not fully taken into account in the tem planning process. Third, the concept of ability, as applied to demand options, appears e ignored. I will deal with these three points little more detail.

The chart on the screen is identical to the one at end of section 1 of the brief, so if you cannot the screen you could look at section 1 at the l of your brief.

With regard to the first one, that the forecast is low, there have been three distinct regimes of wth in the demand for electricity in Ontario ce 1970. The first, up to 1976, had growth raging around 6.6 per cent per year, just ler the sort of traditional 7 per cent.

The second regime starts in 1976 and is a ime of low growth, 2.3 per cent per year, ulting in part from the oil crisis which pressed economic growth; and second, from enormous electricity price increases in 1976 l 1977 which raised the real cost of electricity Ontario by some 40 per cent.

There is a sort of hiatus for 1982, which was a ort and sharp recession, followed by a very oid recovery to about the first quarter of 1983. nce 1983, but excluding the rapid recovery rtion, growth has been about 4.4 per cent on average.

Ontario Hydro, in the face of this, has been recasting underlying growth in the order of 2.7 r cent. During this period since 1983, electrici- price increases have been extremely modest, der one per cent in real terms per annum. In '86, there was a collapse in world oil prices.

What this suggests is that in the near term, the xt five years or so, if there is to be another ange of regime, it is more likely to be one wards accelerated growth than towards declining growth. Later in the 1990s we may have another oil shock, but we may deal with it differently from how we dealt with the 1973 one. At the moment, of course, oil prices are considerably below what they were after 1979 in real terms.

AMPCO's position is that over the period we are talking about, now to the end of the century, what we are most likely to see is growth in the order of 4.4 per cent, if not higher, possibly diminishing down to a level of about 4 per cent by the end of the century. If that is true, the result would be something like 4.2 per cent from now till the year 2000. My colleague Don Nevison will talk about some of the implications of that on the supply side.

1420

The second point deals with load forecast error. Here, I would like to refer you to the report you have in your hands by the Electricity Planning Technical Advisory Panel to the Minister of Energy. In their report, on page 42, they recommend that "Ontario Hydro modify its planning method to incorporate probability-based risk assessment for choosing among options." This is to make allowance for forecast error.

With respect to load forecast error, Ontario Hydro already does precisely what the technical committee is recommending. It does so in a rather more sophisticated way than the committee envisions, by taking into account a number of sources of variability simultaneously in its frequency and duration model. You can read about this in the Reliability Criterion for Generation Planning Report, 603 SP, put out by Ontario Hydro in August, at pages A-5 and A-7.

AMPCO's objection is not to the planning methodology but to Ontario Hydro's practice of including only about half of the variance due to load forecast error in its planning. What it amounts to is that Ontario Hydro, in considering load forecast error, takes account of the variation in load due to business cycles but assumes that the underlying growth rate is correct in its forecast. This assumption, AMPCO feels, is clearly not warranted in the light of Ontario Hydro's forecasting record since 1982, where the forecasts have been consistently low.

The introduction of load forecast error into the system planning process has the same effect as a reduction in system load factor. It puts a premium on flexible resources, such as coal-fired generation, and it results in a system with higher unit costs; in other words, the minimum cost

when you have a lower load factor system is higher.

The longer the planning horizon and the farther out you have to forecast, the larger is the forecast error; therefore, the larger is its allowance and the greater effect of reduction in load factor on the planning system and, consequently, the bigger is the penalty in terms of misallocated resources.

It is AMPCO's contention that the greatest opportunity for enhancing efficiency lies in reducing the approval lead times and the construction lead times, where possible.

The technical advisory committee also addressed itself to the credibility of the forecast. It is concerned at the magnitude of the 20-year forecast error range and it attributes this to existing forecast methodology. The size of the forecast error range is simply a measurement of our ignorance of the future. I guess it is AMPCO's contention that our ignorance of the future is very considerable.

In its recommendation 5, the committee suggests throwing money and people at the problem. This was also one of the recommendations of the Porter royal commission. It was implemented; they threw lots of money and lots of people at the problem. However, in the case of the Porter commission recommendations, we stuck to the track record and not some assumption as the basis of the load forecast error probability distribution.

The British provide a horrible example of the dangers of this kind of thing. They threw money and people at the forecasting problem in the early 1970s and, having done so, predicted that they would thereby cut the mean square error of the forecast in half. This was a foolish but very convenient and pragmatic prediction to make, given the political pressures of the time.

However, the experience was that the mean square forecast error doubled, and the British got into a lot of trouble. I guess the moral of this little lesson is that if you want credibility, you have to earn it. You cannot just announce to the world, "I am now credible." This is simply a caution. It is not an argument against attempts to improve forecasting methodology.

Perhaps where the effort to improve forecasting methodology might have the largest payoff, however, is in forecasting what the gross domestic product for Canada will do. One of the sources of errors in past forecasts has been the errors that were made, pretty well by consensus, about the course of the economy from, shall we say, 1973 to the present.

As for reducing the forecast error, I am j
issuing a warning against assuming that all
these chickens will hatch instead of coming ho
to roost. As I said before, credibility cannot
created. It must be earned. It takes a long ti
and a long series of observations to find
whether, in fact, your forecasting record
improved.

The third element concerns the reliability
demand options. Here, I guess we are talk
about some conflict between means and en
One of the attractions of demand options is th
potential for reducing the need for additio
capacity at less cost than that of adding capac
to the system. When a hydraulic unit is addec
the system, its contribution is measured by
dependable output, peak and energy; that is
output of peak and energy that can be depend
upon 85 per cent of the time. We know how mu
it costs.

A thermal unit is assigned a maxim
continuous rating, but its load-carrying capab
ty takes into account its forced-outage rate a
the requirements for scheduled and operat
maintenance. I have a pretty good idea of h
much we are going to get and how much i
going to cost. In all supply options, both co
and expected quantities can be estimated w
reasonable accuracy. The costs can then
allocated to customers in a fair manner.

Many supply options provide revenue to
system by virtue of sale of surplus energy and
capacity when they are not needed. Analogo
concepts to these are required for dema
options. Some demand options come pre
close. Interruptible load is one category t
does. Both the costs and the quantities are kno
fairly well in advance and can be taken i
account in planning and accounting. Instead
forced outages, however, there are market for
which operate. Customers are eager to b
interruptible when Hydro has a large surplus a
the likelihood of being interrupted is quite lo
So the price of interruptible is cheap when th
is a surplus.

On the other hand, when the supply situation
tight, customers are anxious to firm up th
contracts; that is, the amount of interrupti
tends to shrink as contracts come up for renew
Mr. Parker indicated to you that many
AMPCO's members are looking very seriously
their interruptible contracts and are thinking
would be wise, when their contracts termina
not to renew them.

In order to retain existing interruptible,
alone acquiring new interruptible, the price

rruptible that Hydro must pay must rise in se circumstances. So there is an element of ability, if you want, of interruptible. There is nty of it when you do not need it and it tends to kind of scarce when you do.

0

Another form of demand option is load lting, such as that which can be expected in implementation of time-of-use rates. These e the effect of increasing daily and possibly ual load factor. However, load shifting may nslate into very limited capacity displacement.

For example, the load is very temperature-sitive. When it gets very hot or very cold, load l increase over the entire period of the spell of ather, which may range from a day or two to eral weeks. It is more difficult to predict the ntity of load that will be shifted and, more ticularly, how it will react on capacity uirements.

As one moves down the wide spectrum of nand options such as the substitution of more cient motors towards efforts to persuade sumers to alter their consumption patterns, cost can be estimated with a small degree of or by careful budgets. However, quantities y not only be subject to very large margins of or, particularly with respect to their ability to lace capacity, but also the effects of some enditures may not be quantifiable at all. The ord seems to bear this out.

Now I would like to talk about the idea of nand-option equilibrium. Are there forces that d to push demand-option strategies in an cient direction? I will argue that perhaps there not. This is another quibble about means ner than ends.

Where demand options are viewed as mega-jects involving very large expenditures, they almost bound to succeed but not necessarily ough any increase in economic efficiency. ey may apparently succeed only to the extent t the resulting increase in unit prices reduces demand for electricity.

Demand options carry with them another risk customer cost. This is the increased burden on stomers who are deprived of power supply by son of insufficient capacity, such as would ult from a serious overestimate of the yield m the demand-option expenditures currently ecast in the order of 5,500 megawatts of acity reduction by the year 2000. Here the erence is the Ontario Hydro energy marketing nch report to the minister, June 1988, page 3:

"If it can be assumed that the foregoing ngers have been avoided and the demand options are successfully implemented, a further problem remains. In so far as successfully implemented demand options have the effect of keeping the price of electricity below the level that would otherwise prevail, then the demand for electricity will be stimulated to a greater or lesser degree, depending upon the response of demand to price. To this extent, an efficiently implemented option will appear to be less effective than it actually is, while a useless program may well appear to be effective." So there is a bit of a paradox involved there, and the forces do not necessarily operate as an incentive towards efficiency.

The depressing part of all this is that Ontario Hydro has yet to develop believable estimates of the amount of conservation achieved in the campaigns of the 1970s. Moreover, there seemed to be no plans afoot to measure the progress towards the capacity displacement objective of 1,840 megawatts which is stated to be achieved by the proposed $1.2 billion of expenditures between now and 1993. The $1.2 billion makes it a megaproject.

But with supply options, on the other hand, there is a form of equilibrium. Because real interest rates are now positive instead of negative, as they were in much of the post-war period, the unit cost of supply options tends to be greater than the average cost. Therefore, when you build a supply option, you tend to increase average unit costs. That by itself tends to depress demand via the price mechanism, while providing the supply reduces the gap between demand and supply. So there emerges a concept of a planning equilibrium, which is not so readily apparent when resorting to demand options.

Supply options are focused. Many demand options are very diffused and soft. Demand options consist of programs designed to make a large number of individual power users modify their power consumption. Their nature is to be diffuse and have high administrative costs. As mentioned previously, supply options involve expenditures to increase capacity, a specific plan of a specific size in a given location.

The expenditures may accrue to some power customers via a competitive bidding process which tends to award contracts to the more efficient suppliers. These expenditures are financed and eventually paid by power consumers through power rates.

A note of caution on providing incentives to industry. For demand options, it is the least efficient consumers who are the most promising targets for effort to promote efficient use. If these

are to be given financial assistance to improve their consuming practices, how will this be received by the more efficient brothers of these prodigal sons where the brothers who have already paid the required costs out of their own pockets?

Granting financial incentives to a company invites the risk of altering its competitive position at the expense of other power consumers, including its competitors. It is important for this reason that these kinds of activities be conducted in a completely open manner, and that a mechanism for registering complaints and hearing appeals be incorporated in any financial incentive scheme.

That concludes my three points on the demand side: the forecast is too low; forecast error should be more fully taken into account in system planning; and a caution on the reliability aspect of demand options–however desirable the ends are, the means need to be scrutinized most closely.

I will turn it over to Don Nevison to talk about the supply side of the equation.

Mr. Nevison: Mr. Chairman, members of the committee, as has been explained, my role today is to raise a few points about AMPCO's concerns on the supply side. I will just take a minute here to put a prop on this machine.

I am away from the mike. Can you hear me without it?

Mr. Chairman: We need to record what you are saying, so why don't you put it on anyway. There is a written transcript produced of this.

1440

Mr. Nevison: Okay, finally. I propose to run through the major points that we want to raise and then I will come back and discuss each point briefly.

The first one is lead times. Lead times must be cut. That seems a little bald, but I do this deliberately to stress the point. Bulk supply needed in the 1990s; nuclear preferred. External purchases desirable. Fossil okay only as stopgap; independent generation okay but limited; hydraulic okay but limited; and a firm emergency supply plan, comparative.

Coming back to the first point, about lead times, it is difficult to understand how it can take five years to make it possible for all interested parties to have their say on redevelopment of an existing site; three years would seem more reasonable. It is impossible to understand how it can take eight years if it is a new site.

There is room for dealing with the construction time as well, in AMPCO's estimation. Eight years to build a nuclear plant seems to be r than excessive. If they were to stick to de that have already been approved by the At Energy Control Board and not undertake n revisions just for small improvements, we t they could probably cut a couple of years off

The other point about lead times is that the really bad news for both the supply and der options because they can lead to crash prog and crash programs inevitably turn out t inefficient and even ineffective programs.

Bulk supply, in our contention, and Larry Higgins' estimate of what the load likely be in the year 2000, will be required e 5,500 megawatts of conservation is effec We estimate at least 6,500 megawatts wi required in addition to conservation by the tu the century. Others put it at a higher figure we are being moderate, conservative.

Nuclear is AMPCO's preference for capacity-factor bulk supply. We think in the run it will turn out to be the cheapest. Fu more, we think it will do less harm to the g environment, particularly the atmosphere, any fossil-based source.

Purchases from neighbouring province certainly desirable if they can be made reasonably economic basis. Even if you ha pay a premium, if you can get some that tide through a short spell for a few years, the think these things should be pursued.

Fossil is okay if we have to use it, but w learning more and more about the probler burning any carbon-based fuel. You may be to scrub out some of the pollutants, but ca dioxide still goes into the atmosphere. I thir recently publicized fears of what this is goi do to us are a pause for more consideration the use of that sort of fuel. But you will ge situations where you will have to use it ar course, there is a sizeable amount of it now Hydro system.

Independent generation, under which we cogeneration and small hydro, other renev resources, certainly should be encouraged body could take a position that you shoul develop these sources.

It is AMPCO's position that cogener should be bought back at a rate up to av cost, that maybe a small premium, as is done, can be paid for small hydro and rene resources such as waste burning, this so thing, because of their renewable nature ar fact that they are comparatively benign t environment.

Iydraulic is okay, but it is limited and so is the ount of independent generation in our view if s to be tied to cogeneration and the small ewables. If you were to consider installing, s say, a large fossil plant burning natural gas :ause there seems to be a surplus of natural gas he west now, AMPCO does not think that is a sonable approach. First, it is a poor use of a mium fuel and, second, who can guarantee price of natural gas from the west over any sonable period?

\s I was saying, hydraulic should be devel- :d where it is economic. One thing that has to remembered with most of the hydraulic irces now in Ontario is their very low capacity tor. You will be adding a resource to the tem that is really not ideal because the system d factor has been increasing, and if these ıe-of-use rates which have just been intro- :ed have the effect we hope of tending to tten the load curve, then the system load factor l increase even more. But, again, if hydraulic ırces are economic, they should be developed.

Dur final point is that we need Ontario Hydro produce a firm emergency supply plan. It is all ht to say, "If this happens, we might do this; or hat happens, we might do something else," but would like to see something laid out so it can publicly scrutinized and evaluated, and it uld be treated as a matter of urgency.

In aid of that, and at the prompting of MPCO's executive director, we have a couple suggestions here as to what a supply plan ght be which could help the situation by the d-1990s.

It consists of redeveloping Hearn and Keith by 94 and probably introducing this new fossil- ed technology called IGCC: integrated gasifi- ion combined cycle. Even though it does mp carbon dioxide into the atmosphere, you n start off with natural gas. That should be a pgap arrangement. The second thing to do is to buy 2,000 megawatts from our neighbours. e third thing is to complete Darlington B by 98.

While that certainly will not produce any great rplus, it may see us squeak through the thin ots between now and the end of the century. ıank you very much.

Mr. Chairman: Thank you. Do you have me concluding remarks, Mr. Parker?

Mr. Parker: Maybe just one additional alifying comment to the question of the major ncerns that do surround the use of nuclear wer, particularly the concerns related to safety d spent-fuel disposal. It is our understanding that major studies of this are well in hand and, indeed, the feasibility of its safe disposal has been accepted in principle by Switzerland and Sweden.

Unfortunately, we do not have anything we can lay in front of you at this point in time, but we would like to leave that with you. We have been trying to find out more information about that. We think it perhaps behooves the committee here also to find out more about it, because we think it is a very important consideration.

1450

Mr. Nevison: Thank you. Sorry, I forgot to mention that. The one reference that I got this from is, I think, called the Sparrow report, by the Department of Energy, Mines and Resources. There are references in that report that give more.

Mr. Chairman: I believe that report has been distributed to members of the committee. Are there any questions from the committee? Mrs. Grier.

Mrs. Grier: You refer to the nuclear option, which is your preferred supply source, as Darlington B. Does that mean you have taken a position on location? Do you feel that location is the appropriate place?

Mr. Nevison: We think you could bring it into service most quickly if you repeated Darlington A on the same site, and there is land there, as I understand it, for that. It may raise some questions about transmission, although I am told that, strictly speaking, they will not have to build any more transmission. There is some uneasiness about the transmission being heavily loaded in any one corridor. With that caveat, we think that is the best opportunity to get a new nuclear plant on the system.

Mrs. Grier: I take it then you would assume that it would not be subject to an environmental assessment because it would be on the same site and subject to the same approvals Darlington was subject to?

Mr. Nevison: No, we would not assume that. I understand that any nuclear plant anywhere in the future will have to undergo the normal approvals. Just because that has not happened up until now, we do not assume that it will not take place. What we are saying is that surely it is not going to take for ever to hold the necessary hearings and deal with the thing fully and ventilate all the issues. An existing site helps that to some degree.

Mrs. Grier: Just on that tack, I was interested in the section in your report on expropriation and the concepts behind why we expropriate. I do not

think it was yours; it was Mr. Higgins who referred to that. It strikes me, as I read that section, that you are assuming that the only consideration of those who have perhaps opposed some of the proposals that have taken a long lead time has been compensation. You suggest that expropriation occur and sites be acquired ahead of time, and that if compensation was adequate, it would prevent opposition. Do you really believe that is still the case today?

Mr. Higgins: No, and I do not think that is the point. I think the point I was attempting to raise was that compensation may not be the whole answer, and I am sure it is not. I am equally sure that it is probably part of the answer.

I look upon somebody who is expropriated as contributing to a project for the public good. I guess what brought me to this conclusion is the unhappy thing that happened to the poor residents of the Arrow Lakes valley during the Columbia River development. They were expropriated at far less than the replacement value of their holdings, yet they were the ones who contributed the resource to make the Columbia River development, regardless of what you think of its merits, possible.

I regard these people as victims, and I did not mean any connotation that people who are being expropriated are greedy. I just think people who are in the way of compensation should be regarded as contributors to the public good and should get a commensurate reward for it at least in the ratio to market value of the benefit-cost ratio of the project. It will not solve the whole problem. It might ease it a little bit. What I have in mind is not bribing people, but if they get expropriated having some measure of giving them just compensation.

Mrs. Grier: Anticipating thereby that there would not be the same degree of objection to a project as there has been in the past?

Mr. Higgins: I think that is right. For fairminded people, if they feel they get fairly compensated, I think their reaction would be quite different from what it is if they feel they are being ripped off. Very often they do, with some justification.

Mrs. Grier: Can I just ask one question about cogeneration or independent generation? If Hydro were paying the full avoided cost to those who were going to be generating, do you feel the potential would be greater for your members and others to participate in that kind of a supply-side option? Have you any idea how much might be generated that way?

Mr. Nevison: We more or less agree that present estimates of about 1,400 or 1,
megawatts–they range depending on the sou
of the estimates–or about one year's gro
depending upon what rate of growth you ap
will be achievable by the end of the year on
basis of paying up to avoided costs.

But one thing that has to be realized when
are talking about cogeneration is that we
talking about two forms of energy. While it
very efficient combination, you have to have
industry that needs heat and electricity in
proper balance. You do not find that in ev
location.

You can point to institutions like hospitals
universities and what not, but the study that
done for the ministry by Acres Consult
Services Ltd. a year or two ago did not seem
find much potential in institutional sour
Something in the order of 1,400 or 1,
megawatts does not seem to be out of the w
but still, that is only one year's load growth–
only 4.5 per cent or four per cent of the loa
that time.

Mrs. Sullivan: I wanted to ask a questio
Mr. Higgins in relationship to his comments
the load forecast. I wonder if the associa
approves of or has a comment on Hyd
planned reserve margin of 25 system-minute
power. Is that adequate or do you think it sho
be changed?

Mr. Higgins: I guess in the main brief
comment on that. Its primary characteristi
mysterious. The 25 system-minutes, as it tr
lates into a risk of not having enough powe
think amounts to something in the order of 2
24 per cent. The adequacy of that is a questio
whether it is optimum or it is not.

There are two things that might argue that
too low. First, Hydro mentions that the stud
the customer outage cost done in 1981 ne
perhaps to be updated. Those costs may h
risen since 1981. Second is the thing on
left-hand side of the graph, the sharply ri
curve; if that goes up, then the optimum dem
margin goes up.

1500

The other part of the equation is the carr
costs of spare capacity, when you have too mu
Your choice is between not having eno
capacity and having too much. I am not enti
certain whether they include in the carrying c
the sales revenue from surplus capacity f
secondary sales to the Americans. If tha
excluded, I think it should be included, and
would lower the costs of having excess capac

at would tend to move the optimum margin up newhat.

A third element that comes into this thing is the ecast error of which I spoke. The Hydro ocess, when I last looked at it closely, orporated only half of the forecast error for the id of lead times we had. I think it is very portant to incorporate all of the load forecast or you are likely to make, the assumption ng that you are not going to be any worse ecasting in future than you have been in the st, which is not nearly as heroic as the one the itish made.

If you can shorten the lead times, you would n shorten the planned reserve margin that you ed. If you incorporate all of the forecast error, n the optimum point would tend to move ther. The elements in it are the size of the ecast error, outage rates and these forms of certainty, the customer cost function and the st of carrying capacity which is surplus to the tem.

Mrs. Sullivan: I have a second question, on a ally different topic, relating to Mr. Nevison's nments relating to the construction lead time. vas interested in your comments that Hydro ould stick to the approved Atomic Energy of nada Ltd. designs and not make improvements changes. Surely one of the important things t Hydro does is indeed work on nuclear ctors and make technological improvements t not only increase safety, but also improve the iciency of the plant itself.

Mr. Nevison: Yes, but if you are familiar with clear designers, any kind of designers, they nnot resist tinkering and are always wanting to ke small improvements in the next model. hen you stand back and look at these improvents, they may not be all that earthshaking. The idency then–in fact, it is not a tendency, it is a tainty–is that if they change the design even in iall measures, the Atomic Energy Control ard goes into a brown study for two years oking at these things, so that delays everything.

As I said when I was talking earlier, lead times anything that extends the time over which you ist forecast are everybody's enemy. If you ve no lead time, you have no problems. If mething comes up tomorrow, you immediately ve some countermeasure for it, but if you have look for something 16 years from now you ve a different proposition. If there are some nuine improvements that can be made, in fety particularly, why okay, they have to be tertained; but a lot of these improvements are engineers' improvements. I am an engineer and I think I can speak that way.

Mrs. Sullivan: That is why I asked you the question.

Mr. McGuigan: Mr. Higgins, you mentioned the possibility that many of your members would change from interruptible power to guaranteed power. I want to explore more information. Do you have that option? In other words, if you want to make that change, does Hydro have to give you the positive power, even with the higher cost, or can it say to you, "No, you are permanently in that situation of being interruptible"?

Mr. Higgins: When you sign an interruptible contract, it has a time clause in it. When the contract runs out, when the lease runs out, you do not have to renew it.

Mr. McGuigan: So you are as entitled to positive power as anybody else.

Mr. Higgins: I beg your pardon?

Mr. McGuigan: The company you might represent would be as entitled to positive power, the firm power, as any other consumer.

Mr. Higgins: Yes, the firm power.

Mr. McGuigan: So really it is not a hollow threat when you raise that possibility; it is something–

Mr. Higgins: No, it is a very real threat. The market operates. In the early 1980s, during that period of slow growth when the growth stopped and the supply kept coming on out, it was a marvellous time to buy interruptible power. But Hydro sells this only on the basis that you have to give them it enough notice before interrupting it so that it can arrange alternative supplies, because by buying interruptible power you are basically providing a portion of Hydro's capacity on which it counts. That is subject to contract and expiry. It is like a plant that has an expected life. The contract has a very clearly defined life.

Mr. McGuigan: The differential is pretty well around 10 per cent between the–

Mr. Higgins: The differential is 10 per cent; that is what it has sort of been selling at. But if we get into a crunch in the early 1990s and you offer 10 per cent, nobody is going to be interested. The thing about interruptible power is that you can sell all kinds of it when you do not need it; it is impossible to buy when you do.

Mr. McGuigan: It is kind of like credit.

Mr. Higgins: That is right, it is exactly like credit.

Mr. McGuigan: When you do not need it, you can get all the world full of it.

With more sophisticated manufacturing processes coming on stream, they have become less amenable to interruptible. They have liquids, materials that remain liquid when they are under heat. If you lose that electric heat, you are going to freeze the pipes and so on, and that is the type of thing you are talking about.

Mr. Higgins: That and the robotics, the computers and all of this electronic stuff tend to raise the cost of the interruption to a consumer.

Mr. McGuigan: Just to change the line of questioning, I see, as just one member, that we have two basic plans offered to us. One is the demand and supply plan presented by Hydro; the other was that of the professor from the University of Waterloo, who really said we should make some sort of political decision as to the best guess about what the Hydro requirements might be and then try to match that. To use an extreme, if you had a great surplus, you could have an aluminum plant come in and use that cheap hydro. If you had a great shortage, you would adjust the rates and make all sorts of adjustments as to those industries that you encourage or discourage.

In view of your own doubts about the planning process, that the base planning floor is too low–in other words, you are questioning the process of making economic models–I am just wondering which of those two models you prefer, the sort of political model or the model that uses all these planning techniques.

Mr. Higgins: I guess it is a question of hope and planning. When you hope, you hope for the best; when you plan, you plan for the worst. Certainly, the idea of achieving a shift in perception through the political process sometimes works.

This is the 20th anniversary of the publication of Limits to Growth, and I think people's perceptions about the future changed as a result of that. My own opinion is that this change is attenuating somewhat. In the mid-1970s, we had the reverse of Archimedes's problem. He was trying to persuade people there was a difference between the infinite and the very large, and now we need to persuade people that even though something is finite, it can still be very large.

1510

Mr. McGuigan: He said if we had a plank long enough and a fulcrum strong enough, we could move the world, eh?

Mr. Higgins: That is right, if you could lift into place.

Mr. Chairman: Mr. McGuigan, we ha another questioner and time is just about out.

Mr. McGuigan: That is all. Thank you.

Mr. Runciman: Just a couple of qui questions. I was curious when you were talki about construction and minor revisions and t problems with having a two-year study. I wou think that sort of thing would be an ongoi process. You are talking about a significa environmental hearing process and impact stud Why can those changes not be incorporated that same time frame so that you are not looki for additional delays at the end of that appro process? It seems to me that is the way that wh exercise should function.

Mr. Nevison: I agree with you; that is the w it should function, but there is a tendency people to have second thoughts after all approvals have been arranged, and then introduce what to my mind might be a fai minor improvement in the construction or desi of the plant which send the Atomic Ener Control Board back to the drawing boards. Th would go over the whole thing again. If all t could be done within the longest period, critical path if we want to talk that way, in approval process; sure, let's have the impro ments, but there is a human tendency to ha second thoughts at the last moment and end extending the approval time.

Mr. Runciman: You are not basing this any experience you have had with Hydro in past; it is simply your training as an engineer your appreciation of how engineers operate?

Mr. Nevison: Right.

Mr. Runciman: You talk about cogenerat and you suggested up to the avoided cost. W avoided cost were you talking about?

Mr. Nevison: Whatever marginal cost wo be involved in Hydro substituting its o generation for the cogeneration.

Mr. Runciman: Hydro is talking ab nuclear power, is it not? That was my und standing of it–maybe I am incorrect–in term its lowest possible avoided cost.

Mr. Nevison: That would generally be it, it would depend on the circumstances. T might be considering some hydraulic. As I sa hydraulic is a good thing to do, but there limited amount when you are looking at amount–

Ir. **Runciman:** I am looking for a view from as an organization. When you are talking ut avoided cost, what do you think? What ided cost should we be contemplating?

Ir. **Nevison:** Nuclear is what we think of erally.

Ir. **Runciman:** Why should it not be fossil, example?

Ir. **Nevison:** We do not think fossil is a good g to plan on for large-scale supply in the ire because of its environmental aspects.

Ir. **Runciman:** You are getting apples and nges here. I am talking about bringing eneration on stream. You were suggesting up ,500 megawatts available, based on avoided t of nuclear. What if we operated on the basis etting some fossil off stream, if you will, and ig that avoided cost rather than nuclear? I am wondering what the impact might be.

Ir. **Nevison:** You mean compared to a chase from some private supplier? Is that at you mean, or would it be Hydro's?

Ir. **Runciman:** I am talking about what dro's production costs are. That is what we are ing about.

Ir. **Nevison:** If a fossil-fired plant is a real ion, then that is the avoided cost that should compared to cogeneration, whatever is on the rgin. It is the margin you are looking at down road. If it is nuclear you are going to avoid, n that is the avoided cost. If it is fossil, then t is the avoided cost. It depends what the plan

Ir. **Runciman:** I guess I have trouble getting head around that. If there is a desire to get ne of the fossil production facilities shut down certainly not operating as frequently as they now and you can do that through additional generation, natural gas or through other ans, it seems to me that is the sort of approach i should be taking.

Mr. **Nevison:** If you take that, you are dealing h historical costs, if you are shutting down at is already there. That will not be as good a ce for the cogenerators.

Mr. **Runciman:** Just one final question. I ve a few more, but I will have to let them go til another time. When you talk about the pply options and the significant costs of rlington B, I am wondering if you have any ncern about the Hydro debt and the continuing owth of the Hydro debt.

Mr. **Nevison:** That is one of those slippery estions. I do not mean you have asked a slippery question. It is a philosophical question. How big is too big? If you look at Hydro's financial situation, it does not look all that bad in spite of a very large debt. When you compare Hydro's debt to some of the European public power agencies like the Central Electricity Generating Board or Electricité France, it is quite small. Admittedly, their customer base is much bigger. As a proportion of its assets, it is improving its position.

Nuclear, of course, adds more debt than any other form of generation we can think of, but it pays for itself faster because it is cheaper, unless there is a radical revision to the estimates as a result of this study. Anybody I talk to who is close to it does not expect a radical change.

Mr. Chairman: Mr. Parker, on behalf of the committee I would like to thank your group and panel for preparing this report and coming forward and presenting it to us and for answering our questions.

Mr. Parker: We appreciate having the opportunity to be here and present our views to you. Thanks very much indeed.

Mr. Chairman: If we could move on to our next witness, our next witness is the Joint Industry Task Force of the electrical industry in Ontario. I wonder if that panel can come forward.

Mr. Baldwin, I guess you are heading the panel. Are there enough places for everyone?

Mr. Baldwin: We need one more chair.

Mr. Chairman: I was going to ask you to introduce your panel, Mr. Baldwin, but I see you have brought some audio-visual aids for us.

Mr. Baldwin: We are all ex-Boy Scouts. We have come prepared.

1520

Mr. Chairman: I wonder, however, if you might just introduce the members and their positions for the purposes of Hansard. Then I will turn the floor over to you for your presentation.

JOINT INDUSTRY TASK FORCE

Mr. Baldwin: Among the members we have present today is myself. When I am not dispensing free advice to the select committee, I am vice-president of a company called Federal Pioneer, an electrical manufacturer in Canada. We have Arthur Bowker, the chief executive officer of the Municipal Electrical Association; John Lind, the vice-president of St. Marys Cement; Robert Gillespie, the senior vice-president of Canadian General Electric Co.; and

William MacOwan, the head of Howden Group Canada.

On behalf of our fellow members, we are delighted to be here this afternoon and we thank you for this opportunity of addressing you. For the record, we would like to point out who are members of the Joint Industry Task Force of the electrical industry in Ontario. They consist of the Association of Major Power Consumers in Ontario, the Consulting Engineers of Ontario, the Electrical Contractors Association of Ontario, the Municipal Electrical Association, the Canadian Electrical Distributors Association, the Canadian Nuclear Association and the Electrical and Electronic Manufacturers Association of Canada. We estimate this group employs about 150,000 Ontarians and contributes about $10 billion annually to Ontario's economy; just, as I mentioned, though activities of members of the Joint Industry Task Force.

We have a number of short presentations and we would like to start by first acknowledging that we have already submitted to you a brief, which looks like that. Included in that brief is a document that we have prepared called What Electricity Means to Ontario. As part of our submission today, we will leave with you copies of the overheads that we will be using in our presentation.

At this stage, I would like to turn the presentation over to Robert Gillespie, a fellow member of our force.

Mr. Gillespie: Thank you. When we appeared before the last select committee on energy on April 11, 1986, we concluded our presentation with the quotes and conclusions shown on the slide. We have put them up there again. At that time, they were contemporary quotes from Tom Campbell, who was Ontario Hydro chairman. "It would be unthinkable for us to run short of power because that would, among other things, stall needed economic growth." He went on to say, "It would be unpardonable to lose jobs because of shortage of power." So there was no debate between ourselves and Ontario Hydro at that point in time.

We also had the quote from Hydro's manager of load forecasts at that time saying that there was a 20 per cent chance that the demand would grow at 4.4 per cent a year or more, implying that they anticipated a much lower growth than 4.4 per cent.

A second exhibit from that time were the conclusions we had in our brief to you then, in April 1986, which included the fact that Hydro may now have very little flexibility in choosing between options if it is planning to meet high-growth scenario. We were concerned t Hydro's high-growth scenario might even be low at that time. We had already seen curtailm of power to industrial customers and importat of power and we believed there was a h probability that Hydro was already too late avoid the unpardonable. We recommended t planning to ensure a continued reliable supply electricity must move forward as expeditiou as possible.

With this background, we must say at outset of this submission today that we h become increasingly concerned at the lack recognition of the seriousness of the problems outlined to the committee more than two ye ago. Our previous appearance focused on a ma concern related to the forecast assumpt adopted by Ontario Hydro.

This graph was also contemporary in A 1986. It was taken from Ontario Hydr submission to the previous select committee showed their assumption that the three-y period emerging from the economic recession 1981-82 indicated a significant departure fr the historical relationship between ene growth and electricity demand. Back in 1986 listed the reasons we felt this assumption incorrect and why it would be logical to exp that such an aberration, arising from a recessi would only be temporary and not a signific trend that would continue.

We now believe that it was this wr assumption built into Ontario Hydro's l forecast which has resulted in current forec being consistently low in their projectio Figure 4 shows that the relationship betw gross provincial product and total power c sumed has continued to return to a histor straight-line relationship following the econo upset in the late 1970s and the early 19 through 1982.

In fact, as shown in figure 5, the results in last two years indicate a correction back to historical trend line. Right on the end of solid-line projection, we have dotted in 1988 the first eight months of 1988, electrical c sumption in the province has risen 7.3 per c over last year. Even if you say, "We have extreme weather conditions," corrected for th weather conditions the use of electrical ene has increased 6.1 per cent over the previous y

Our next figure shows that this also holds for the whole of Canada, not just Ontario, o again showing that there is some fairly ste straight-line relationship between the growt

ss domestic product in the country and the sumption of electrical power, apart from that that took place during 1981 and 1982.

nother way of viewing the strength of the tionship between electricity demand and nomic growth is shown in figure 7. It will be n that electricity demand has been consistent- elated to the health of the Ontario economy. period of low economic growth in the mid 0s and the early 1980s was what caused the ving of electricity demand, which in turn sed the Ontario Hydro system to be underuti- d. In retrospect, it now appears that it was not lro's load forecast methodology which was ng during this period.

Iydro forecasters were having the same iculty as everyone else in predicting econom- rowth. For example, the select committee on ario Hydro affairs, in its report dated ember 1979, stated, "The committee is not ecting continuing recessions or even continu- stagnation of the economy: our current olems will be overcome." I think we would all e that anticipation was more than realized in last six or seven years of economic growth in ario.

is clear that Ontario has done a very good job abilizing energy consumption. We have seen ecoupling of the total energy demand from nomic growth. It has certainly flattened out. equally clear that electricity supply continues e the engine of Ontario's economy, and given electricity is our only large-scale indigenous gy source, this is quite appropriate.

0

lew energy-efficient electrotechnologies can the province reduce its overall energy sumption even further. This would entail a stitution of indigenous electricity for import- il and gas.

his makes sense not only from the point of v of provincial economics but could be a onsible policy in response to increasing cern regarding the burning of fossil fuels and move towards sustainable development for future.

f course, the effect of such a policy would be ffset the gains Ontario Hydro hopes to make ne area of demand management. For exam- if we envision a future in which about 20 per of Ontario's commercial and passenger or vehicles are run by electricity, the current and projections do not include allowance for such move and are therefore limiting rding future expansion and environmental ons which the province will face.

It might be that the suggestion of 20 per cent of our automobiles running on electricity sounds like a long way off. It is not a long way off when we understand it takes 10 to 14 years to add significant increments of generating capacity to our system.

Given the long lead times to install generating capacity, this demonstrates the need for maintaining flexibility to accommodate future energy trends and policies. This can only be achieved by planning to meet the highest foreseeable demand.

Also, experience and Hydro's data show that to err on the high side does not result in large penalties. In fact, in provinces such as Quebec and New Brunswick, having facilities built in advance of provincial need has proven profitable by way of export sales.

We firmly believe that Ontario Hydro should be planning to meet at least the same level of increase in electricity demand as we have seen in the last six years; namely, five per cent per annum, corresponding to an economic growth rate of about 3.5 per cent. Failure to plan for that level of growth could have unpardonable consequences for the province's economy and limit future energy policy options.

Thank you. I will now turn it over to Mr. Bowker.

Mr. Bowker: I would like to point out that the Municipal Electrical Association is an active member of the Joint Industry Task Force on behalf of its many municipal utility members.

The first slide gives some of the characteristics of these 315 utilities, the major one of which is that we have over 2.5 million customers. These are growing at something like 60,000 residential, 10,000 commercial and about four large industrial customers per year. I point out that these are in addition to those you heard of in your last presentation, which was from the Association of Major Power Consumers in Ontario who are direct industrial customers of Ontario Hydro.

These 315 municipal utilities range in size from the very small utility serving less than 200 customers to the largest ones, such as those in Metropolitan Toronto. They serve more than 70 per cent of Ontario customers of all types; residential, commercial and industrial. The primary aim of this association is to strive for the establishment of sound policies, high standards of general management and operations and equipment to ensure high-quality service to customers at reasonable cost.

The Joint Industry Task Force, from our point of view–and I point out that we are a little

unusual in that we are a customer-oriented body in an industrial association–provides us with the opportunity for municipal utilities to make regular contact with manufacturers to influence them in maintaining standards and promoting the customers' interests in the area of reliability, cost and efficiency of their products.

In the demand/supply planning strategy hearings, one issue at stake, from our point of view indirectly, is that the level of reliability of supply is important. This must be one of the input parameters in determining the timing of any future programs. This issue is an increasingly important issue with our customers, the citizens and industries of Ontario.

On all fronts, the impact of any electricity interruption is becoming more significant. In our homes, extensive outages may mean inconvenience, discomfort, on the almost trivial side, to the loss of substantial amounts of frozen food or heating in the wintertime.

The time scale for these to have a significant economic impact would typically be measured in hours. Businesses, however, are increasingly dependent on things like computers and point-of-sale stations for minute-to-minute operations and outage affects them almost immediately, both economically and from the standpoint of customer or worker safety.

Many industries are sensitive to outages as brief as a few seconds. Disruption, for instance, of a robot-based production line can ruin substantial amounts of product and take substantial time to get back into operation.

Surveys indicate that our present enviable record in Ontario of reliability is a major reason for locating in Ontario. Even our rural customers have come to rely heavily on electricity for controlling, heating and refrigeration as an integral part of maintaining efficient, safe operations. No sector of our society can any longer be regarded as indifferent to the availability of reliable, safe, low-cost power.

Over the past few years, we have come to have an increasingly serious doubt about projections being used as a load forecast. Recent experience is not in line with the assumptions of growth in the 2.5 per cent to three per cent area. It is time to abandon these arbitrary assumptions and to be more realistic about the coming demands of our citizens and businesses.

This year to date, the system demand is some seven per cent over last year. Over the past two to three years, there are numerous large communities in Ontario which have experienced growth in the 10 per cent to 15 per cent range.

As I said earlier, some 60,000 new reside customers and 10,000 commercial customer being added to our customer list every year. even add about four large industrial custo per year in our municipalities.

At the beginning of this decade, stren arguments were advanced that load fore projections should be revised downward. was done on the basis of a few years' obse tions, and rightly so: if growth is low, it shou taken into account in our planning. Howev now appears that this was a transitory situ and that the adjustment was somewhat overd The same arguments advanced then to lowe levels should now lead us to adjust the for upwards, probably in the range of 4.5 per ce five per cent. As the chart shows, the vertica is percentages of growth year over year. It is ragged, but you can see there has been a tend for declining growth. The rebound afte recession in the late 1970s and early 1980s s to leave us in about the five per cent area.

If an error is to be made–and we do under that the only sure thing about forecasts is they will be proven wrong–it would seem prudent, at least, to be on the high side. always possible to delay programs, sell surp or simply underutilize plant. It will neve possible to get electricity from plant we fai build.

Our members are now gearing up to i ment demand management and conserv measures. Customers will be encourage conduct their affairs to minimize deman their utilities and thus on Ontario Hydr course. Time-of-use rates will be implem starting at the end of this year and will be a u tool in promoting a wise-use philosophy. I listed on the chart a series of areas where w significant activity in the near future.

We have a number of studies in these nearing completion to determine how com ties of all sizes can be involved in programs, what types of activities ca promoted and how utilities can institute grams to achieve the needed results. Mun utilities will meet these challenges. They they must. They also know their custome and will help.

However, we do have to accept th projections show a need for new capacity. matter of when. Whether we use Ontario H estimate of the mid to late 1990s or, as we more realistic one of early 1990s bef shortfall arises, it is clear that the tim procrastination is long past.

it takes 12 to 14 years to get approvals and truct a plant, either time frame is unattain- and our options will be very limited. Even generous estimates of demand manage- t, cogeneration and independent hydraulic lopment, the shortfall by the year 2000 is valent to almost two plants the size of ington.

)

is time to establish and accept criteria and egies that will be known to be acceptable in ance for meeting environmental approvals political acceptability. Within such a frame- k, Ontario Hydro should then be in a position confidently develop plans and proceed to lement them with suitable, straightforward edures. It has been said that delay is the dliest form of refusal. This is no time for y.

would like to pass on to John Lind at the other of the table for the presentation from the ociation of Major Power Consumers in ario.

Ir. Lind: I am following a presentation ady made by AMPCO, so I would like to p my remarks as short as possible and as cise as possible. I would imagine it has been cribed to you earlier that we do have 62 mbers who consume about 21 or 22 per cent of tario Hydro's output. We do employ directly r 200,000 people. You can put the numbers to as well, that indirectly that might double.

The reliability of power is, of course, a great ncern to the industrial sector of this province. at is one of the reasons that a lot of industry is ating in this province. It is almost imperative t we continue with a reliable source of energy.

As you have heard, there have been a number interruptions this summer with the companies plants that have purchased interruptible power have interruptible power contracts from tario Hydro. As I came into this committee om, there were some questions being asked out interruptible power, the cost, etc. I might ntion that I did not hear discussed at that time t there is a time lag of five years from the time u negotiate with Ontario Hydro out of the erruptible contract to back-to-firm power. So re is an extended period of time.

Some months ago, there was a report by the nistry of Energy stating that Ontario is 30 per nt less energy efficient compared to industrial untries such as the United Kingdom, Japan and veden. I think there are a lot of misnomers. iose statements are misleading because we are t comparing two similar countries.

Ontario is a resource-based province. We export a lot of those resources. To produce them into a form that we can export does create a lot of energy consumption. Regarding transportation, we are a very big country. Transportation costs are very high.

There are a lot of areas in this report that do not coincide with the environment in Ontario. Again, if that is the case, Ontario industry is very energy efficient, which has been pointed out in various federal government studies over the past four or five years; i.e., industry in Ontario or in Canada has dropped its energy consumption by over 25 per cent, which is a great deal of energy.

Other than that, I have nothing further to comment on from the position of AMPCO.

Mr. MacOwan: I would like to follow my predecessors and support them with some more detailed comments on the general question of reliability.

In the early 1980s, Ontario Hydro researched the effect of supply reliability on customer cost. This chart shows the first part of the equation–the effect of system reliability on the cost of the electricity produced. I point out that in that chart no credit is taken for export sales of surplus power, which could occur if reserve margins were not required.

If equipment and people were perfect and the weather predictable, the minimum cost would occur with zero reserve margin, but extremes of temperature occur with little warning and a generating plant is complicated equipment requiring regular maintenance. You would not board an aircraft if it had not been serviced in its previous history. Worldwide experience says we need a reserve margin of about 25 per cent on a system with a mix of energy sources such as ours, if we are to hit the optimum combination of reliability and cost.

Move to the next chart, please. This part of the equation is the extra cost the customer will incur due to interruptions in supply if the system is not reliable. The chart shows the costs as they affect the customer. You will see they are at a minimum when reserve margins are in excess of 28 per cent, but they increase very rapidly when margins fall below 22 per cent.

We put those two charts together combined into this one, which gives the whole equation, and I hope it is an understandable picture. Again, it is in terms of cost experience to the customer. Clearly, the optimum level occurs at a system reserve margin of around 24 per cent. A 24 per cent reserve margin would provide the best

economic outcome to all customers who need reliable supply.

Be very conservative or very rash, according to your point of view, and reduce that 24 per cent figure down to 18 per cent.

Mr. McGuigan: Before you move that chart, can I point out that when we were at 40 per cent about four years ago, it still put an extra cost impact of only between four per cent and five per cent. At that time we were decrying the fact that we had a 40 per cent oversupply.

Mr. MacOwan: When you had a major oversupply?

Mr. McGuigan: Yes, at 40 per cent. According to your chart, that added only between four per cent and five per cent to the actual cost of electricity. What I am pointing out is that the impact of oversupply is not all that great.

Mr. MacOwan: Exactly. We have been trying to say that already. I am sorry I did not make that clear. Oversupply is something you can use for all kinds of purposes if it is available. You can export it. You cannot create it if you need it and it is too late.

Mr. McGuigan: Five per cent is significant, but it is still not 25 per cent extra cost; it is only between four per cent and five per cent.

Mr. MacOwan: What I was leading on to is that we base that on a figure of 18 per cent reserve margin. If you had been wise, you should have perhaps, in my view, gone with a higher figure than 18 per cent. We have used 18 per cent because we believe you cannot argue against it. I think it is too low because it brings customer supply security into the realm of luck, and today's industry, commerce and transportation do not run on luck.

If I may go to the final one, which shows some history, this chart is based on the 18 per cent reserve margin and shows the history of demand and supply in Ontario Hydro from 1972 projected to 1990. The chart is not based on Ontario Hydro information directly but on information released by the Department of Energy, Mines and Resources in Ottawa earlier this year.

The white columns are Hydro's actual or approved planned total supply, including future power purchases. The figures are net, allowing for the 18 per cent reserve margin. The black columns are the actual demand figures for the years in question. Note that on last year's figure we have a little mark down the column showing what it would have been have been if we related those figures to a 24 per cent margin instead of an 18 per cent margin. On a 24 per cent gross margin, which is this kind of world-acceptal figure, our demand was already in excess of c supply. I think it is perfectly clear that if grow continues at five per cent, we are going to be trouble by 1992, earlier if we use the mo realistic 24 per cent figure.

1550

There are other factors which should considered. It is already known that a Hyd nuclear unit is out of service for retubing and coal-fired unit is out of service for the addition pollution-limiting equipment during the 199(These episodes alone will eat up much of t reserve margin. Further, a high proportion Hydro's coal-fired units are approaching the e of their economic life. A most important on already mentioned, is that under present routin for planning approval it takes 10 to 14 years build a major generating plant.

You should be clear that if we are thinking only technological limitations, those times cou be halved. I believe this one chart shou convince you that we do have reason to be grea concerned by the problems which face th province. If we do not take care on that end, are going to be in trouble. Thank you. May return you to Doug Baldwin?

Mr. Baldwin: We would like to finish o presentation with five brief conclusions. Th are:

1. There is an urgent need to initiate cost-effective demand management programs expeditiously as possible.

2. Introduction of new energy-efficient ele trotechnologies will, in part, offset gains fro demand management. As you saw in figure there, what we are saying is electrotechnolo will, in effect, be a substitution of indigeno electricity for imported oil and gas; that is, it w lead to electricity taking a bigger portion of t Ontario energy pie.

3. Ontario Hydro should have effective pla to meet an increase in electricity demand of fi per cent per year.

4. Beyond the identified demand manageme potential, major supply additions should alrea have been committed.

5. Given the current concerns relating to t combustion of fossil fuels, nuclear power a pears to have environmental benefits for futu supply, in addition to the economic advanta claimed by Ontario Hydro.

Mr. Runciman: Before you, AMPCO h mentioned 1994–I think the quote from one the gentlemen was we could be running out power by 1994–and you have suggested

ewhat weaker scenario in terms of that chart. deed we are facing that sort of a situation, do you think should be done in the near term eet that sort of, I guess you could describe it crisis?

r. Bowker: As I mentioned, municipal ies are gearing up for a major demand agement program to try to reduce peaks. We nate that there is something like three to five ent there to be got and we are hopeful that we achieve those amounts. That is equivalent to another couple of years with a respite, but it rtainly worth having. Other things we will be g in the communities will be looking at noting energy-efficient appliances, this sort ing. You might be aware that there is recent lation in this province to encourage that. ortunately, those things are quite slow to a major impact. I do not think it will do a lot e near term, but in the longer term I expect it .

Ir. Runciman: What you are really saying n you are talking of 10 to 14 years for the oval process and construction phase of a or project, and the initiatives that are within abilities now, is that we simply are not going e able to meet the needs. There is no way nd it. That is really what you are saying.

Ir. Bowker: That is right.

Ir. MacOwan: I would add that I think we e to explore every possible option–all the es of demand management and soft energy all the various other things–but ultimately have to face the need for major plant itions. There our big problem is going to be time it takes to get to the point of saying, "Go ad, build the plant and have it running." If ernment could do something to streamline the rovals process, that would be one of the most l pluses that could happen.

lear in mind as an example the fact that–I eve it is, but I can be corrected by my nds–the Bruce plant is still short a transmis- n line to export some of its power to southern ario. I do not know how many years ago it is v that the Bruce plant was authorized. That held up due to one form or another of nning approval.

Ar. Bowker: I think one of the major blems we have had is the approvals process. e of the executive directors of Great Lakes ver tells a series of almost horror stories about difficulty he had getting approval for lraulic sites for his company to build more nt just north of Sault Ste. Marie. He tells these jokes and it really does not do our society much credit when he is able to tell these stories about multiple agencies he has to deal with, delays in each one, all serial, and no great certainty of being able to get plans approved in advance. They embark on these and throughout the whole process they are uncertain about whether they are making any progress.

I was also disturbed when I looked at some of the comments of the various ministries in response to the DSPS study. I think it would be fair to categorize them as saying: "We are not all that sure about the philosophies, principles and underlying procedures. What we really want to do is wait and see exactly what it is you are proposing in physical terms;" and then we are going to start hearing about what we want to do.

I think we need to arrive at some kind of agreed-upon set of criteria and conditions which must be met by Hydro and then permit it to proceed with a fair amount of confidence that it has met all the rules of the game and now it will go through them and will submit them to the Ministry of the Environment, the Ministry of Energy, each of them in parallel, because they will know what all the rules are, get the process over with quickly and get on with the job.

Mr. Runciman: Mr. MacOwan, I think you talked about the optimum mix in terms of reliability and cost and we have heard a number of witnesses talking about putting all our eggs in one basket and too much dependence on one particular source. Does your organization have a view in terms of what is the optimum mix? You are talking about nuclear as the desired option.

Mr. MacOwan: The ultimate mix has to be the one which allows you to produce power as cheaply as possible and with the least environmental harm. I think that is perhaps something which is variable year to year.

Mr. Runciman: So you do not have a concern about too much dependence on nuclear generation in this province?

Mr. MacOwan: May I say that to some extent you are asking the wrong person because I am a proponent of nuclear. But trying to divorce myself from that, any good businessman would not put more than 60 per cent of his eggs in one basket, and I think Hydro has been pretty wise as it has gone. It has as reasonably wide a mix as it can have, given the fact that our hydraulic resources really are eaten up; there is not much more to come. There is the question now of coal, oil or nuclear. I would not like to take sides in the argument. All I am saying is that the answer has

to be that which is the most economic and does the least harm to the environment.

Mr. Runciman: I have just a couple of quick questions about the environment and the nuclear waste disposal question which has arisen on a number of occasions. Obviously, you feel that is the least of a number of evils in respect to the environment.

Mr. MacOwan: In my opinion it is, yes.

1600

Mr. Runciman: Do any other members have any other views on that?

Mr. MacOwan: They are welcome to say their piece.

Mr. Gillespie: In the conclusions we presented, the words which are representative of the joint committee, we acknowledged that nuclear power appears to have environmental benefits for future supply in addition to the economic advantages. What we are saying is, when you get to the bottom line, it would seem to us that nuclear is still a very desirable option.

Mr. Baldwin: Or, as the Association of Major Power Consumers in Ontario put it, it is probably the preferred supply–

Mr. MacOwan: Given an assurance of, say, the disposal of wastes, which is how you opened your question.

Mr. Runciman: I do not know how significant this is. I have not gotten an answer at this stage, but I read something about the impact nuclear plants have in terms of water temperature with respect to the Great Lakes. I know AMPCO was talking about a Darlington B on the same site. Has anyone done any in-depth investigation with respect to the impact on the Great Lakes, the temperature increasing over a period of time, and what that might mean to the lakes?

Mr. MacOwan: I believe that has been done. I do not know the figures offhand, but I recollect–and I can be corrected, I hope–that the effect of our existing nuclear plants on Lake Ontario is equivalent to that of a few hours' sunshine on a summer day.

Mr. Runciman: Who has carried out that research?

Mr. M. C. Ray: On a supplementary, Mr. Chairman, could we have a response from Ontario Hydro on that question?

Mr. Runciman: If there is research on it, I think it would be helpful to the committee to have it in our hands.

Mr. Chairman: Could I ask whether Hydro has any information on that?

Mr. Taylor: We can have a look, Chairman. I am sure we can get some infor tion to you.

Mr. Baldwin: It should be pointed out there are quite tight regulations on the temp ture rise of the water flowing through any pl not just nuclear, and most of those are in the or two-degree area. If that became a problem could always resort to such things as coo towers which, of course, reject to the at sphere. It is not a complete answer, but it distribute the effect. We are always monitor of course.

Mr. McGuigan: Mr. Lind, when I questioning about interruptible power, the pression I got was that whatever length contract was entered into for interruptible po whether it was five, 10 or 15 years, you w not alter it until the contract ran out. Is the clause in these contracts that allows yo change it within a five-year period?

Mr. Lind: I think most contracts are writt the way that if you found it inadvisable uneconomic to purchase interruptible powe your plant or industry, you could appr Ontario Hydro. They would look at the situa They have a two-year time span to accept tha put you back on firm power. During two-year time span or including that two- time span, you will not be back on full powe a period of five years. It is three years after acceptance of that; so it is a total of five before they could, by the contract, put you on firm power.

Mr. McGuigan: If a large number of pe decided they wanted firm power, we coul there in five years.

Mr. Lind: You could be there in five y which I believe uses up some of the reserve Hydro has calculated in its reserves. I do think it is a great amount, but those number calculated in their reserves.

Mr. McGuigan: Thank you.

Mrs. Sullivan: I am looking at the cha page 16. In relationship to that chart, assuming you have left out some of the t Hydro includes in its forecast, such as na conservation. Am I correct in assuming, as that you are not including any demand ma ment predictions, in terms of your forecast

Mr. MacOwan: That is correct.

Mr. Bowker: There is some demand ma ment allowance in there. It is just to the uppe of the chart. There is some hydraulic capa cogeneration, and so on.

Irs. Sullivan: There are 150 megawatts of eneration here. So the additional hydraulic udes independent generation–

Ir. Bowker: Yes.

Irs. Sullivan: –as well as Ontario Hydro / hydraulic, and then 150 of cogeneration. ose figures in your predictions are substantial- lifferent from Ontario Hydro's predictions of nand management achievements by the year 0, including incentive-driven efficiencies of o 3,500 megawatts. I am wondering why you sceptical or why is it not included?

Ir. MacOwan: No. We are not being ptical. We merely have tried to put on this rt what, at the point in time the chart was le, had been approved. This is, as it were, ow-through stuff. Yes, there are a lot of other igs being thought up and being worked on ich could result in quite substantial amounts of ing. That is really another question.

Irs. Sullivan: In that situation, I wonder ere the members–the groups that comprise the it Industry Task Force–would see themselves terms of the delivery of efficiency of servation methods.

Ir. MacOwan: How soon will it be effected?

Irs. Sullivan: And what your participation uld be in terms of whether it is production of re efficient technologies or whether it is in ns of salesforce activity. How would you fit) Hydro's own marketing plans?

Ir. MacOwan: I think Doug Baldwin can tell ı what the Electrical and Electronic Manufac- ers Association of Canada has been doing for ny years in terms of improving.

Ir. Baldwin: There are a number of commit- s. We have the president of EEMAC here ing at this table. In terms of looking at ways could produce more efficient electrical uipment, there are probably one or two ceptions where our equipment can be proven to perhaps a little less efficient than some of the eign equipment available, but in general we nk our equipment is relatively efficient.

We recognize those areas where improve- ents can be made. We have a number of mmittees within EEMAC that are looking at w to make their equipment more efficient.

Giving some examples, I think consumer rigerators were mentioned, that the Japanese, instance, have a standard that requires high grees of efficiency and achieves high degrees efficiency on their refrigeration appliances.

For us to meet that standard and for it to be ective for Ontario Hydro and result in savings, would depend on how quickly the consumer wants to spend that money to buy the new products. You do not achieve it overnight. In my estimation, and I am not an expert on refrigerators, you are probably talking 15 to 20 years before you can convince consumers to switch to more efficient products.

Even if tomorrow we came out with every product that we make being as efficient as anything that is available in the world, I think the impact on reducing Ontario Hydro's demand would be staged over quite a long period of time, as you convince people to spend the capital to make the changes. It would not happen overnight.

Mrs. Sullivan: No. That is why I wondered where individuals, individual groups or agencies or even companies saw themselves in that marketing mix that would lead to a conservation strategy.

Mr. Gillespie: I think that for some years now we have been working in that direction. I do not know why we are picking on refrigerators, in particular, but the Energuide system has caused us to reduce the power consumption of refrigerators very significantly in the last 10 years by increasing insulation in refrigerators and improving compressor efficiencies.

There is always some ultimate that we can shoot for, as Doug suggested. There has been a steady, I believe, substitution of more efficient units; for instance, electric arc furnaces over the old type of furnaces in many of the larger industries.

One of the things we find here, and I think it is partly related to your earlier question of why we are not acknowledging the conservation potential in our equation, is that I believe we do acknowledge the conservation potential, but that is in large measure being offset, or even overwhelmed, by the movement to electrotechnologies from other sources of power consumption.

1610

I could not give you the exact numbers today, but if you recall one of the curves that I put up showing the very significant flattening of the overall energy consumption in Ontario as a percentage of gross national product, overall energy was flattening out, but electrical was still driving up with the GNP or even slightly higher. That is because many of the less-efficient fossil fuels, for reasons of environmental cleanup and efficiency, are moving into electrical technologies. It makes that equation a little more difficult to balance.

Mr. Lind: May I make a comment on that? Industry in general–large industry and the resource industry–has in fact spent numerous dollars over the past 10 years or so to improve its energy efficiency, because of the energy crunch with fuel and now with the electrical crunch. As has been mentioned, the increased consumption of electricity stems from energy source switching for environmental or economic reasons.

There is a demand, and we feel the demand will continue. There is room for more improvement, but it has to be cost-effective. We have taken the large masses, the large chunks. There are small ingredients of electrical energy that can be saved yet, but they are not as cost-effective as the large chunks and volumes that have been taken.

Mr. Bowker: As a representative of one of the groups selling electricity to that segment of the market, I would like to confirm that. It is very easy to persuade an industry to make improvements, provided you can confidently go in and show where it is a cost-effective proposal. On the other hand, if you are going to ask them to spend $100,000 out of the goodness of their hearts and never see a return on it, you really have some arm twisting to do.

Mrs. Sullivan: In your experience, the incentive becomes doubly important in combination with the payback period?

Mr. Bowker: That is right. They always look at the payback period.

Mrs. Sullivan: I am sorry, Mr. Chairman, I should not do this, but I am wondering about things like municipal street lighting.

Mr. Bowker: You are talking about the high-pressure vapour lights. There are quite a few communities in Ontario that have converted. They have in fact observed very substantial savings in energy, and maintenance too for that matter. I think that is a real area where we are going to see a lot more movement in the near future. We see them up the Don Valley Parkway and in quite a lot of communities. When you are flying over the cities, all you do is look for the funny orange colours, and that is it. There are getting to be a lot around. A lot of municipalities are doing it.

Mr. Chairman: Mr. MacOwan, did you have a comment?

Mr. MacOwan: I was only going to add the fact that one has to be very careful to keep those questions in perspective, because improvements in energy efficiency are not across the board. One cannot suggest that the whole of Ontario Hydro's output could be affected by improvements energy efficiency. It depends on the secto Broadly speaking, you are talking about indu try, commerce, residential and so on. Th breaks down into a whole lot of different areas. effect, some you can make and some you canno

Mr. Bowker: I think you would have to very careful, too, to segregate the ener conservation–where we are saving pounds uranium, tonnes of coal or what have you–a the demand-management-type things. What are talking about here, for the most part, that w have an impact on new plant required, is dema management. After we improve that, we w then probably still see growth similar to what are seeing now. It is rather ironic that when we to international conferences of other utilities utility people we ask, "What is your load factor We say, "Well, up around 75 per cent." "Oh, y must be from Ontario."

A lot of these other areas are striving to get 50 per cent load factors, and that leaves an aw lot more room for improvement and dema management than we have in Ontario. If you h a 100 per cent load factor, there would absolutely no room at all to make improveme by demand management except to reduce co sumption somewhere.

Mr. Chairman: Thank you, Mr. Bowk Mr. Baldwin, did you have any concludi comments?

Mr. Baldwin: Again, we would like to tha you for this opportunity. We hope perhaps y will find it useful.

Mr. Chairman: On behalf of the committe would like to thank you and your panel, M Baldwin, for coming in and speaking with us, taking the time to prepare the presentation t you did, for allowing us to ask you questions a for coming with the audio-visual aids. We v have to recommend that more panels come in t way, so thank you again.

Mr. Baldwin: Thank you, Mr. Chairman.

Mr. Chairman: I wonder if I could ask next witness to come forward, the Federation Engineering and Scientific Associations.

Mr. Bailey, I wonder if I might ask you introduce the members of your panel. I think do briefly introduce in your presentation nature of your organization, but I wonder if might summarize that for us. We have about an hour for your presentation, so if you co perhaps summarize it in 15 or 20 minutes, would give us maybe 10 minutes for questio

FEDERATION OF ENGINEERING AND SCIENTIFIC ASSOCIATIONS

Mr. Bailey: First of all, I would like to ɔlogize to all the members for our not being le to get copies of the brief to you in advance; fact, they just barely got here at all. But we are arge organization, and the process of internal nsultation sometimes takes more time than we icipate.

The federation is a parent body for some 21 ɔfessional and managerial bargaining groups, sically, across Canada. We have groups from berta to New Brunswick, but the majority of r groups, the majority of our membership is in tario. Two of our larger groups are directly ected by the decisions made by this commit-. One is the Society of Ontario Hydro ɔfessional and Administrative Employees, ually known as "the society," and they resent some 6,600 professional and supervi-y staff within Hydro. The other group is the ciety of Professional Engineers and Associ-s, to which I belong. My two colleagues are e from the society, and it represents some 370 ɔfessional staff in Atomic Energy of Canada l. Candu operations out in Mississauga.

Now, I will not say we are in an awkward sition, but we are in a somewhat anomalous sition of commenting on the work that has en done by some of our members. Obviously, demand-supply options study was at least ived at and in part authored by individuals who society-represented staff and thus members the federation, and so I think it is important t we define our position.

We are not here to endorse the supply-demand dy simply because it was written by our mbers. On occasion, in some places, we have ɔsen to comment on the conclusions or the essments made in the brief.

20

We do think the demand-supply study is an nirably comprehensive assembly of facts and tual assessments, professional best estimates, which the government and this committee can ke their recommendations. It is clear the study studiously refrained, and I think quite rectly so, from making any definitive recom-ndations or any final conclusions as to ategy. It has done the homework but it has left conclusions and assessments to be deter-ned by this committee and the government, h appropriate input from the public. We nsider we have put on a different hat from that employees; we consider ourselves to be part of that public and this brief is part of the public input.

I should state at the start that the federation fully supports the procedure being followed, the public review of the full range of electricity planning options, to help ensure that Ontario Hydro's future programs are economically, environmentally and publicly acceptable. It is entirely appropriate that the assessment of the supply alternatives should be subject to this external review with full public input before decisions for the next 10 or 20 years are made. We do, however, have some reservations about the process. This type of comprehensive review is very time-consuming and should be done only at major decision points.

We also feel there is a potential for delays in making needed decisions and that issues of an economic, technical or factual nature with time scales of up to 10 to 15 years run the risk of becoming increasingly politicized. I recognize, of course, I am really asking to have the barn door shut long after the beast is loose on the land.

Other than these concerns, we feel that the opening up of the electricity planning process to public involvement in this manner can only help to demystify the process, to deal with misrepresentations that have occurred as to the cost and availability of supply options and to provide the citizens of the province with increased confidence that the right decisions are and will be made.

In the brief, basically from pages 5 through 7, we summarize our conclusions and I am going to go through those conclusions and not go into the greater part of the brief. If someone who was reading ahead wants some specific details, basically, the conclusions summarize the rest of the brief.

The first point is that we are concerned. In fact, we will make the blunt prediction that there will be power shortages in Ontario in the mid- to late 1990s. Part of the input to making that prediction is the predictions on increased growth in electricity demand and our own feeling, having reviewed the study, that the growth rate may well have been underestimated.

Basically, the study estimates or predicts an annual growth rate of about 2.6 per cent to the year 2000. We believe there are indications to suggest the growth rate could be more like the four per cent we have experienced in the 1982 to 1988 period. This would mean that the demand-supply shortfall by the year 2000 could be closer to 8,000 megawatts than to 4,000 megawatts.

We also point out that a major factor–and I suggest the panel that was just before us would probably have said the same thing even more emphatically–in the economic development of Ontario has been the availability of reliable, low-cost electric power. Industry must feel that the power will be available when needed. Otherwise they are simply not going to locate in this province.

This development, availability of reliable, low-cost electric power, has been, in part, the result of a highly motivated, technically competent staff at Ontario Hydro. Commitment to the demand-supply options to ensure future power should stress continued respect for the competence and professionalism of Ontario Hydro staff.

The nuclear industry: The nuclear industry in Ontario is a major Ontario industry which should be supported. There are some 25,000 to 30,000 jobs in this province and, we estimate in the brief, some 4,000 professional, supervisory, managerial jobs which are directly involved in various aspects of the nuclear industry in Ontario. Failure to maintain the nuclear option while other options are being considered or implemented is likely to result in the loss of the experienced design team presently built up at Ontario Hydro and qualified and experienced industrial suppliers.

We do support the timely completion of the concept assessment phase of the Canadian nuclear fuel waste management program and the preparation of a strategy for implementation of an acceptable nuclear waste disposal concept.

With respect to the demand-supply options, our recommendations are as follows: We recommend a broad-based planning strategy, including practical demand-management options; maintenance and rehabilitation of existing supply facilities; state-of-the-art conventional generating technologies, including nuclear; and the development of promising alternative supply technologies. We believe such a broad-based strategy would be in the best interests of the people of Ontario.

We believe the nuclear option should be maintained so that it is available when future major additions to base-load generating capacities are required. In this respect, we note that the 13-year lead time for nuclear, coupled with the estimated supply shortfalls for the year 2000, suggest that planning and design work, although not necessarily commitment, for another four-unit nuclear plant should be initiated soon, as design staff becomes available with the comp tion of the present Darlington plant.

Further hydroelectric development sho follow an orderly approach based on ri systems, giving priority development to ri which are already partially developed or indir ly affected by existing developments.

New clean-coal technology options and proved environmental controls should be de oped for the rehabilitation of existing fossil plants and construction of new ones.

The employment impact within Ontario o various supply options should be one of factors taken into consideration in choo alternatives. In this respect, we feel that option of large-scale bulk imports of power f neighbouring provinces should be consid only if there are significant savings in deliv power costs over made-in-Ontario genera options. Those are our recommendations conclusions.

Mrs. Grier: I am struck by your descripti what DSPS is, because it is somewhat at vari with the conclusions of the outside review p which reviewed it for the government and which we met early in these hearings, w characterized the strategies as being some vague and all-inclusive and suggested that was not enough clarity between strategy plan. You, in your praise of DSPS, are obvi seeing it as a plan that has laid out totall options.

Mr. Bailey: On the contrary, I believe clear, or at least this is the inference I got w read it, that they studiously refrained suggesting any plan or recommending particular options but instead provided committee with the facts and figures, the da some cases, it required estimates and as ments as to availability, cost, potential prob etc., but it studiously refrained from makin particular recommendations. It does resul document that lacks focus in the sense that is no definitive recommendation, but I thin clear that Hydro, which is so often accus foisting already prepared plans on the go ment, has gone out of its way to avoid doin To criticize them for it, I am not sure is fa

Mrs. Grier: As far as you are concerne feel Hydro has done an adequate job and t that really remains is some public commen that and then the government can m decision?

1630

Mr. Bailey: Given the criticism ma Hydro for, in effect, making the plans,

e what I believe the public wanted and this islature wanted; in effect, to say to the ernment and legislative committees like this: re are the facts. You give us policy direction which way we should go both in terms of ning and of overall strategy." We do not rrel with that. We think that is probably an ropriate thing to do every 10 or 15 years–not ry year, of course.

Irs. Grier: Do you think the lead time for lear plant needs to be 13 years?

Ir. Bailey: I have a special interest here ause I am involved with the Candu 300 plant. think we have a lead time of about six or en years.

Irs. Grier: Candu 300?

Ir. Bailey: Candu 300 of the Atomic Energy Canada Ltd. It is a much smaller plant; we e tried to get our lead times down. Much of t is due to the process of getting environmental essments, public input, etc., not necessarily a ign lead time. You can design and construct lear plants in considerably less time than that.

Ir. Runciman: I just wonder if you can tell a bit about Candu 300. You say it is a smaller lear plant. I have not heard anything about it.

Ir. Bailey: It is referred to in the demand-pply study as the AECL 400-megawatt plant. It a new design. The intent is to try to get it structed in three and a half years from first icrete and another two years for obtaining provals. Obtaining approvals, of course, is out the hands of the designer or the utility. It is y 450 megawatts and a lot of the economies of le are against it. The study, I believe, records estimated power at about $51 per megawatt-ır compared to $34 on an additional four times l-megawatt plant. You pay a price.

There is no such design at present in a larger e, either by AECL or Hydro. I have been olved in the nuclear business for some 22 ars now, and the plants have followed on fairly ickly. We have never had the opportunity to go ck and spend two years redesigning from the und up in order to achieve a much faster istruction rate. I am sure the people from CL would be glad to provide you with much re detail on such a plant.

Because of its small load size, I am not ggesting that this would be a suitable option for itario. It is intended for foreign markets and irkets in other provinces of Canada where a 0-megawatt unit size is very competitive. That he most common size for new coal plants–400 d 500 megawatts–and this plant is intended to compete in that market both in Canada and internationally. But 450 megawatts is half a year's load growth in Ontario.

Mrs. Grier: I have just spotted your estimate of the prospects for cogeneration on page 19, where you say it is unlikely to exceed 300 to 500 megawatts.

Mr. Bailey: Yes.

Mrs. Grier: Is that based on existing prices?

Mr. Bailey: Existing prices for which form of energy?

Mrs. Grier: We have heard vastly different estimates from other people who have been before us.

Mr. Bailey: I will turn it over to Kurt who is much more knowledgeable in this.

Mr. Johansen: Are we looking at page 19?

Mrs. Grier: Yes, in your section on demand management options.

Mr. Johansen: Yes, and your question is?

Mrs. Grier: I am surprised that you anticipate as low as 300 to 500 megawatts additional power through cogeneration. Other people who have appeared before us have been much more optimistic in their estimates.

Mr. Johansen: I would ask you which side of the cogeneration partnership you are talking about. I believe we are expressing a judgement or feeling–it is hard to predict these with any precision–that cogeneration is not going to amount to as much as the forecasters and perhaps as industry would like to see. It is a judgement call. I do not think that particular range is very crucial to our case, in any event.

Mrs. Grier: Presumably, at that level of expectation, it contributes to your judgement that we will be short of power by the 1990s.

Mr. Bailey: Oh, I think the idea that there could be 4,000 megawatts' worth of cogeneration out there is clearly unrealistic.

Mr. Johansen: No one is forecasting that.

Mr. Bailey: It depends on the economics. For example, a pulp and paper operation in the north has to install capital equipment to generate power. To do so, there must be an economic incentive. The power benefit that the operation gets from supplying power to Ontario Hydro must pay, and more than pay, for the extra capital costs it is putting into the equipment.

If you have a paper mill already installed, with all the existing processes for getting rid of the waste, in effect, you are having to make an extra

capital investment purely for the purpose of cogeneration.

When I produced this estimate, I was basing it on the fact that, with the shortages of wood or the threatened shortages of wood, there is very little new investment by pulp and paper mills in other sources of energy.

As for processed steam in southern Ontario, again, you are dealing with very high energy cost oil or coal or natural gas. I am not entirely sure that people are not just trying to generate processed steam more efficiently than they have in the past instead of looking for ways of taking some electricity off the top.

It is very rough and ready, and I must admit we have not looked in any detail. It was just those sorts of factors that it led to.

Mrs. Grier: I guess your members would not be involved with Dow Chemical or any of the companies that are contemplating cogeneration, because you are mostly with Atomic Energy of Canada Ltd. and Hydro.

Mr. Bailey: And a lot of other research and development companies; aerospace, for example, and some of the municipal hydro, but we have no members at all in the electrical or chemical industries.

Mrs. Grier: Thank you very much.

Mr. Chairman: Thank you, Mrs. Grier. Seeing that there are no further questions from the committee, Mr. Bailey, I would like to express appreciation on behalf of the committee for your coming in today and for preparing the presentation. If it makes you feel any better, this afternoon we received the documents for a presentation we had last week. You certainly gave us your paper before you started, anyway.

Mr. Bailey: I told my colleagues that just in time is the latest craze in the automotive industry, and it looks as if many of Ontario Hydro's additions to capacity may also be worked on that same theory.

Mr. Chairman: Thank you. Again, we appreciate your coming in and taking the time to prepare this document and to speak with us.

I wonder if our next witness, the Canadian Electrical Association Inc., could come forward, please.

Mr. Read, I wonder if you could introduce your panel. I will turn the floor over to you. You might explain what the association is just briefly so we have a context. We have about one half hour; so I will leave to you how you would like to use that time.

CANADIAN ELECTRICAL ASSOCIATION INC.

Mr. Read: My name is Wally Read and I president of the Canadian Electrical Associati On my right is Hans Konow, who is the direc of our public affairs department.

Basically, we are an organization and association that represents principally the Ca dian electric power utility industry across country on a national basis. Our member utili really embrace just about all of the utilities Canada. Those utilities generate about 98 cent of the power used in Canada and export Three of the largest ones are Ontario Hyd Hydro-Québec and BC Hydro.

We have some other members, manufactur people, university people and research peo who are interested in the activities of the uti industry. That constitutes our membership. mainly deal with the federal government behalf of some of the Canadian electric utilit and at times such as this we have appearec provincial hearings.

I do not know if that is enough to describe association.

Mr. Chairman: Yes it is, thank you.

1640

Mr. Read: We had filed with you, prio August 30, a presentation on behalf of Canadian Electrical Association. I do not wa use any time going through that, but if I migl will just hit a few points in there. Basically, in introduction of that report we talked about importance of electricity in the economy Canada and certainly of Ontario. We talked a about the competitiveness our industry faces, that requires flexibility in all decision-makin the utility industry. We made some commen with regard to the importance of environme and social objectives, and that applies nation and provincially.

We had a section in there on multiple sup options. Historically, the mix in Ontario has b extremely good from the point of view flexibility, being about one third nuclear, third other thermal-fired units and one t hydraulic. I think the mix has been good from a size point of view. We mentioned a that the options should not be artificially limi By that I mean governments or governn direction limiting the options that are availabl the utility with respect to making the right sup decisions.

On the demand side, we talked a bit ab efficiency gains and here we are talking ab

ency of energy use in Canada and in rio. I think one of the great problems here is of a communications problem than it is ssing the efficiency situation. There is a tendency to address efficiency gains or ency of the utility operation, without paying respect to the overall energy efficiency h I think everybody is trying to achieve s this country.

sat in on a little bit of the previous ntation, and we would certainly support the hat in trying to achieve efficiency gains in gy use we must be very careful to look at it in ontext of total energy use and that some- works out to be, unfortunately or fortunate- nore dependence on electricity rather than I would just make the point that it is rtant, I think, to look at not just the ervation techniques for reducing the con- ption of electricity, but rather the conserva- we should preach with respect to efficiency tal energy use. Somehow we have to close nformation gap we have with our customers his. I do not think there is a complete rstanding publicly. I think it is important for tilities to get that message across.

e spoke a bit on the demand options, about rientation of research to the customer side. ainly, I think it is an area which we all realize we are not doing enough work in. We need pend more time researching customer-side ons for better and more efficient operation of ystems.

e mentioned a bit about providing incen- . Those incentives are something which ld be worked out between the government the utility. We mentioned load shifting. We not go into it in any great detail because I your committee is quite aware of what the y is proposing in those areas and that is not of line with what other utilities are doing ss the country.

e talked a bit about regulatory efficiency, I guess if I were to pick out one area where rnment and the utility, not only in this ince but in many provinces, are probably e important than any other, it is in recogni- that time is a resource not to be wasted, as as dollars and everything else. Wasted time lts in higher costs and higher rates. In the latory process, not enough recognition is n to the fact that it plays such an important , when you are raising capital and trying to a project off the ground, in what the end cost be.

We think the regulatory process, in particular in Ontario and in some other provinces as well, really needs to be streamlined to a great degree. There is not a clear path of decision-making and it is a very frustrating experience to try to deal with satisfying all the public interests, all the government's interests and all of the utilities' interests in trying to provide low-cost power.

You heard from previous testimony that it probably takes six to seven years for the real start and completion of a project. I think he was referring to a 400-megawatt nuclear station, but even for some hydro projects seven years is not unreasonable to get it off the ground, build it and get it into operation, even for some of the larger projects. We have had that experience, but it is the other six years prior to that, spent trying to resolve if we are doing things the way the public wants them to be done. We are not suggesting that that process should not take place at all; we are just saying, within that process, try to get it down to one to two years. That should be adequate time if the structure is correct, and if the government structures the regulatory process so that everybody is properly heard and in one approval process, that would be very desirable.

We talked a bit about taxation. That may not be an issue that is particularly of concern to you, but it has been a concern to our association with respect to presentations that we have made to the federal government; that it is important we do not artificially raise rates through taxation or through any other means, because we think the impact on economic growth in the area that the rates are raised would be just disastrous.

In our closing remarks we amplified the importance of electricity in the energy market-place. We have to remember that there is competition out there against electricity, and depending on where you are sitting in this country, whether it is in Ontario, out west or in the Maritimes, the competition is more or less severe. Gas is a big competitor with respect to how much electricity will be used in some of the heat processes, and we may well advance into the electrotechnologies and heat processes.

The real test will be that if gas is obviously cheaper in the west, then those electrotechnologies will not be so well used in the west. If you are down east, you will probably switch to those electrotechnologies, and if you are in the centre, which is where most people are, it is going to be a closer match. That has an impact on load growth, and I think Ontario sits right on the fence when it comes to comparing the amount of gas used for heat with electricity.

However, in spite of all those remarks, I think we anticipate that we are underestimating our load growth in Canada for sure. Certainly as a result of that in some of the provinces, and I believe that is the case here, I think we swung the pendulum and scared people too much about four years ago. It may have been a good exercise, but I think we have to be realistic now and realize that the load growth is closer to, and will likely be closer to, between four and five per cent than down around 3.5 per cent, or 2.5 per cent in some cases as reflected in some provinces.

That is the basic submission that we make on behalf of the industry.

1650

At this point, I could probably just mention something we have not commented on in very much detail, but I think it is an important point to make. I am really referring to the comment of the Minister of Energy (Mr. Wong) in a speech he made a short time ago about the importance of arm's-length dealing between the government and the utility. I think that is recognized in most provinces as being very important. His dilemma was, "How long should that arm be?" That was the way he put it.

I guess from our point of view we would say that government's role really should be to ensure that there is an adequate and secure supply of electricity at the lowest cost within reasonable standards for the environment, as a general sort of statement. But you and I know that traditionally some governments, and I guess some of the suppliers to the government of Ontario, have reached beyond that in trying to control their utilities.

I can cite some examples such as the role they are expected to play in economic development–in other words, trying to influence their rates for more economic development–the policy with regard to which fuels they should use; the extent of purchasing preferences, be they interprovincial or Canada versus the rest of the world, and certainly the encouragement of research and development.

These are the ones you will have to come to grips with, I believe, as to how far you want to go on this. I think it is quite proper for the government to say what its policy for the province is and to make sure the utility follows these. Whether these are legitimate or not, or whether you spell these out in policies, the principal policy is to make sure that there is an adequate supply at the lowest cost with reasonable respect for the environment and that the options are not restricted.

You should allow the utility to look at all o
options, and in that regard I guess I would hav
differ with a previous witnesses whom I h
today. I think it is important that all option
looked at, and that means purchase of power,
purchase of power may be one of the area
which short-term relief can be gained.

Mr. Chairman: Thank you, Mr. Read.

Mrs. Sullivan: I wanted to follow up on y
comments relating to the purchase of power,
particularly in a situation where Quebec,
example, is more open to electricity exports t
we are, but there is an interconnection prob
between Ontario and Quebec and there is al
question of reliability with the Quebec po
source. I am wondering whether, in view of t
you still think that power purchase is a vi
option.

Mr. Read: I think you have to look into
aspect you just mentioned as well as
economics of it. Certainly, with regard to
transmission interconnection, it may not
economically feasible; but I am saying it sho
be an option to be looked at. I guess I was re
saying that in the context that the governm
should not exclude that option just to favour j
in Ontario or things like that. I think that is
option that should be looked at.

You may eventually decide that you are
prepared to pay the premium of lost jobs,
whatever that means, but that should be par
the equation. I think reliability is not someth
that should interfere with your purchase, beca
I do not think either the purchaser or the buye
going to enter into an agreement unless there
good, reliable service.

1650

Mrs. Sullivan: One of the other thing
wanted to ask you was whether other juris
tions in Canada are successfully provid
incentives for parallel generation
cogeneration.

Mr. Read: We have just completed a study
all of our utilities, gathering the informatio
what they are doing with respect to cogenera
and independent power producers, small hy
etc. It has not been a consistent policy across
country.

Some of them have reacted more positi
with respect to finding exactly what they will
for. Some others have been not as well defin
But I think you have to recognize in Cana
versus the United States, that the incentive
offer rates that are likely to be attractive

:pendent producers is not as high, as I say, as in the United States.

'he United States, certainly in the oil-based nomy in the northeast, can offer much greater es for purchase of power. As a consequence, / buy Hydro-Québec exports that are more active. Even for the small power producers, se plants are not brought in very cheaply. :re may be some validity in saying that a ıll, independent, little group can develop a and sell power to a larger utility because it a little more flexibility. That should come out he economics.

All I am saying is that some of the proponents : we should be more into in that area are uenced by some United States experience ich, frankly, cannot and does not relate to ıada because, in fact, our power prices and cost of power for our utilities is cheaper. :re are some utilities, as I say, that do have crete terms available but they are not what I ıld call something to get all excited about if I e an independent power producer trying to ld small hydro.

Cogeneration is a slightly different game. It ends on how much the paper mill or the ustry wants to put into the system. That is nething that should work out in the econom-

Mrs. Sullivan: Basically, then, what you are ing is that there should not be any consider- on at all, for example, of making the incentive independent generation higher at the begin- g, to help that industry develop because mately in the longer run it may help Hydro?

Mr. Read: I do not think it should be in the ity rates. If the government, for some other son, wants to do something specifically ented towards advancing a technology or nething like that, that should be clearly arated from, should I say, forcing the utility to er rates.

This is what happened in the valley in lifornia. The Public Utility Regulatory Poli- s Act legislation forced the utilities to set their chase rate very high, certainly much higher n they could economically produce it from other source, in the interest of getting some of se technologies off the ground, like the wind chines.

Frankly, it has been a failure. It is being rected now and recognized by their own partment of Environmental Affairs, but it was ailure in the sense that it became a gimmick ereby other professions set up companies for relief, because that is what the PURPA legislation permitted, and had no interest at all in the maintenance and operation of the companies they set up.

Those are things that could be corrected by doing it properly in Canada. All I am saying is that we do not want to ship that situation into Canada. I do not want to be negative on the issue. I am really saying that our utilities are very prepared, where it can be demonstrated, under the same terms and conditions, that they can purchase and, in some cases, maybe on the front end help a little bit.

They would be prepared to do this; but I have a problem with transferring the US technology as it was put in place in California up here and our running into the same problems which it now recognizes and is correcting. I do not know if I answered your question.

1700

Mr. Runciman: That is a different story from what we heard last week.

Mr. Chairman: Perhaps we can come back to that.

Mrs. Sullivan: I am finished, thank you.

Mr. Charlton: I just have one very brief question. When you were wrapping up your comments earlier, you used a term I had not heard before. Perhaps you could try to put a little bit of a face on it for us. You used the term "reasonable respect for the environment."

Mr. Read: That is a Newfoundland term probably. If I used that, those are probably not the words I had here. "Reasonable" is not enough today. I think if you look back, what our association has been saying publicly and privately is that there has to be recognition and respect for the environment. That probably means something greater than we have been doing in the past, because this is what the public wants and is prepared to pay for. The word "reasonable" is what you are questioning.

Mr. Charlton: Yes.

Mr. Read: I would not want that to be interpreted as, "If everything else is okay, well, we'll take a look at it." That is not the case, and I am sorry if I left that impression.

Mr. Charlton: Thank you.

Mr. Runciman: One of the witnesses from the Joint Industry Task Force said that Ontario Hydro should be planning to meet the highest foreseeable demand–there is no penalty–and he suggested we could export any surplus. How do you see the export potential in the next 20 to 30 years? Do you share the view that there is no

penalty if you do indeed build to the highest foreseeable demand?

Mr. Read: Our association has been saying for some time now that it is better to err on the side of surplus rather than take the chance on running short. In that statement, I guess, comes the question you have asked, "How tightly can you run this to the line?" We are saying that the United States market, for a short time, probably through all of the 1990s, is going to offer an opportunity to help you if you are in a surplus situation. In fact, that is what it has been doing over the last five to six years.

We think that yes, it does offer us some help. Even if it was not there, it is important, because of the time constraints of getting new generation on, so that we do not get into trouble and only find out about it when we are in trouble. To get out of that trouble would take us 10 or 12 years, with a very depressing effect on the economy, especially if we take into account that we are now taking all the elasticity out of our system. We are, or should be, going with minimum reserve requirements. We are certainly taking part of what used to be a hidden reserve. If we really got into trouble, we could reduce the voltage by this much. We could take the interruptibles off and do all these things.

Those are all things that are inherent. They are not inefficiencies in the system, but they certainly play a part in how much energy you are going to use in this province. You, being a large province, have a very large capability to make certain adjustments, but if we screw down the ability to adjust to a sudden change in the economy, a depression or an expansion, then we are saying that either we have to raise our reserve limit to be able to respond quickly or we have to build for surplus conditions to take care of it.

Mr. Konow: If I might just expand on one aspect of the export question, I think it is incorrect historically to look at the trade that has grown between Canada and the United States in exporting electricity as one of meeting an absence of supply in the United States. In fact, a good deal of that trade has been predicated on a cost advantage enjoyed by Canadian electricity. In the northeast, for instance, there was almost invariably adequate supply of high-priced, oil-fired generation. The Americans chose to back that out and buy Canadian power.

When you look at the future, it becomes a complex call between looking at American capacity and expected requirements and also whether Canadian electricity will maintain its price advantage. If it does, it is not illogical to assume that there will always be a deman replacement electricity in the United States a cost-competitive perspective.

Mr. Runciman: There is another eler too. I am not sure of the cost factor. When w about nuclear being the lowest cost in terr generation, New York state made a decisi respect to a plant on Long Island to clos thing down, tear it apart and increase its rel on offshore supplies. Cost advantage doe come into that picture in terms of that decision, anyway.

Mr. Konow: No, although it is interesti was in Washington a week ago, and a numb people were betting that that plant and an one up the coast will, after the electior opened and running. There are two plar believe–Shoreham and I have forgotten the one–which were unable to clear the evacua planning hurdle in their jurisdictions. Giver they were not desperate for the power at the that stopped their development, but a l people in Washington are saying that onc election is past and the birds come home to in terms of power requirements, these plant be licensed.

Mr. Read: I think it is interesting to note the biggest exporter of electric energy acros Canada-US border is Ontario, not Quebec. been for many years, but looking to the fu there will probably be a shift in that.

Mr. Konow: If I might make just one point in supplement to what Mr. Read has sa the Public Utility Regulatory Policies Act i US, I think it is a very important topic and th no question that very substantial amoun power have been brought on stream in place California.

One of the problems we face is that people to compare the purchase price in Californ elsewhere in the United States sort of doll dollar translated into Canadian price and sa is what we ought to be able to earn. Of cours reason for the high price is that American p is more expensive; so even based on mar cost comparisons, it justifies the implantin certain technologies which we would p premium for here. That then asks, "Why w you pay a premium?" and then you begin to "Perhaps it is to back out fossil fuels," o judgement or another about the requiremer that power.

All we caution is that the Canadian s characteristics are different from those i United States. There is a very clear track r down there. I think it would be well wort

nmittee's time to ensure that you get the spective of various players down there because there are very strong advocates on one side l very strong critics on the other.

guess my final point on that topic would be t the notion of obligation to serve is an portant one not to be forgotten when you bring discrete increments of independently financed wer. As a businessman, if I am not making a lar out of my business, I can fold up my tent, lare bankruptcy and walk away. A utility not do that, and a province or a state or a intry cannot rely on "perhaps." When it comes nergy, you have to have it. You have to make sure that in there this whole notion of obligation to serve and who controls that process is taken care of.

Mr. Chairman: Are there any questions or concluding comments?

Mr. Read: Just to thank you for the opportunity to present what we did.

Mr. Chairman: Thank you for coming in, Mr. Read, and for your presentation and the documents you gave us earlier. We appreciate your taking the time to speak with us and to give us the benefit of your perspective.

The committee adjourned at 5:10 p.m.

CONTENTS

Monday, September 19, 1988

SELECT COMMITTEE ON ENERGY

Chairman: Carrothers, Douglas A. (Oakville South L)
Vice-Chairman: McGuigan, James F. (Essex-Kent L)
Brown, Michael A. (Algoma-Manitoulin L)
Charlton, Brian A. (Hamilton Mountain NDP)
Cureatz, Sam L. (Durham East PC)
Grier, Ruth A. (Etobicoke-Lakeshore NDP)
Matrundola, Gino (Willowdale L)
Ray, Michael C. (Windsor-Walkerville L)
Runciman, Robert W. (Leeds-Grenville PC)
South, Larry (Frontenac-Addington L)
Sullivan, Barbara (Halton Centre L)

Substitutions:
LeBourdais, Linda (Etobicoke West L) for Mr. South

Clerk: Manikel, Tannis

Staff:
Argue, David, Consultant; with Passmore Associates International
Richmond, Jerry M., Research Officer, Legislative Research Service

Witnesses:

From Etobicoke Hydro:
Hastings, John, Vice-Chairman

From the Ontario Metis and Aboriginal Association:
Recollet, Charles, President
Reid, Christopher, Legal Co-ordinator

From the Association of Major Power Consumers in Ontario:
Parker, Tom, Immediate Past Chairman; Director
Higgins, Larratt, Economist
Nevison, Donald, Consulting Engineer

From the Joint Industry Task Force:
Baldwin, Douglas V., Chairman and Vice-President, Federal Pioneer Ltd.
Gillespie, Robert, Executive Vice-President, General Electric Canada Inc.
Bowker, Arthur J., Chief Executive Officer, Municipal Electric Association
Lind, John, Vice-President, St. Mary's Cement Ltd.
MacOwan, William, Head, Howden Group Canada

n the Federation of Engineering and Scientific Associations:

ey, Chris

nsen, Kurt

n the Canadian Electrical Association Inc.:

l, Wallace, President

ow, Hans, Director, Public Relations

Ontario

No. N-17

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy

Electricity Demand and Supply

First Session, 34th Parliament

Tuesday, September 20, 1988

Speaker: Honourable Hugh A. Edighoffer

Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the ba[ck] together with a list of the members of the committee and other members and witnesses tak[ing] part.

Reference to a cumulative index of previous issues can be obtained by calling [the] Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Servi[ce,] Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toron[to] M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Tuesday, September 20, 1988

The committee met at 10:12 a.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY
(continued)

Mr. Chairman: Our first witness today is ve Diener, who worked on the report for the nistry of Energy on cogeneration potential in tario. You have each been given a copy. We ve had them previously as well.

On that note, Mr. Diener, I guess I could turn floor over to you. Perhaps you could nmarize the report for us. I note it is a little re than a year old. There may be a few things u would like to add to update it. Then we could ve questions from the committee, if there is y time left.

STEVEN G. DIENER AND
ASSOCIATES LTD.

Mr. Diener: Good morning, ladies and ntlemen. I think the way I would like to oceed is to go over the updated version of this port, updated and somewhat expanded in terms sensitivity analyses. It is reflected in a paper I lieve you have. I propose to go over this paper her mechanically, but I think it would save us ne to do that first. Maybe 15 or 20 minutes at most would be taken up with going over this per. That would leave, I hope, sufficient time discussion, questions and answers on any mber of issues that are of interest to you based the presentation.

I should say I am very pleased that these cussions are set in the context of reviewing dro's longer-term investment planning. I nk it is an opportune time to examine the role cogeneration to help meet Ontario's future eds for electricity cost-effectively.

The objective of the paper is to present recent earch on the potential cogeneration markets in industrial and building sectors, with empha- on the industrial users. In this regard, I will be ying heavily on my work on the study generation Potential and Barriers to Its Devel- ment, a study that was undertaken in 1986 for Ministry of Energy, and on some recent alysis I have conducted on the impacts of gher buyback rates on the potential for generation. My second objective is to address w these cogeneration opportunities may be realized. In particular, I would like to suggest some ways in which the various parties could contribute to the timely and mutually beneficial realization of these opportunities.

Let's start out with some definitions–cogeneration, first of all. I apologize if I am going over some old material for some or many of you, but I would like to define some of these key concepts right at the outset. Cogeneration is simply the combined or joint production of process heat and electricity, and hence it may also be referred to as combined heat and power, or CHP, which is more the European or British nomenclature.

Cogeneration is based on a well-known group of technologies which are not new at all. These include steam turbines, gas turbines and diesel engines. All of these technologies have been known and practised since the 19th century in Europe and North America.

The merit of cogeneration lies in the fact that it can produce electricity with a far greater degree of energy efficiency than is possible in a conventional thermal power generating station. When you are producing electricity by cogeneration, the waste heat from the power-generating cycle may be diverted and utilized to provide process or space heat type of energy through steam or hot water.

It is essentially a waste heat recovery process in the context of electricity generation. Only the heat energy that is actually consumed in the generation of electricity is attributed to its production. As a result, cogeneration requires less than one half of the fuel used in a conventional generating station to produce the same amount of electricity. Put another way, cogeneration will improve the efficiency of electric power generation more than twofold, from 35 per cent, which is typical in a conventional thermal power station, to 80 to 85 per cent, which is a typical figure for cogeneration plants.

The feasibility of a particular cogeneration project and, more broadly, the market opportunities for cogeneration across Ontario may be defined in terms of four types of potential. This is very important, because you will see many studies, and I am sure you have seen a number of these, where people talk about potentials without

really defining what the heck they mean by potential or market opportunity or whatever. These potentials may be referred to as technical potentials, economic potentials, financial potentials and, finally, implementation potentials.

As shown in exhibit 1, the market opportunities become successively smaller as we move from technical to economic, financial and implementation categories of potential. Ideally, in a kind of nirvana of no market imperfections, the economic, financial and implementation potentials would all be equal. It is only because we live in the real world of market imperfections that we have this hierarchy of successively smaller potentials.

Technical market potential, the largest quantity or magnitude, is defined as the total cogenerated electricity of electric power in megawatts from all projects which could be developed, using currently known technology without considerations of whether they are viable from an economic or financial point of view. It is a kind of theoretical upper limit, given today's known technology.

The economic market potential, in turn, is defined as the cogeneration capacity of those projects that meet the criteria of economic feasibility. This feasibility is determined, as was the case in the Ontario Ministry of Energy study, on the basis of whether or not a project was beneficial to the province as a whole. A commonly used indicator of such economic feasibility, and the one used in that report, was based on the concept of supply price of cogenerated electricity. Supply price is simply a levellized production cost. It is also known as resource cost in the jargon. It is calculated as the real dollar price per kilowatt-hour of electricity that is required to meet the project's costs at a given discount or interest rate. It is really an analysis of cost competitiveness.

All costs are measured over the economic life of a cogeneration project and will exclude transfer payments such as subsidies and income and other taxes. If a cogeneration project can provide electricity at a lower supply price than that associated with conventional bulk generation, it will be judged to be economically feasible.

Financial market potential is based on a narrower perspective, that of the investment decision-maker, and hence an economic project may or may not turn out to be financially feasible. In contrast to the economic evaluation, financial analysis includes all taxes and subsidies prevailing at the time of the analysis and will use market interest rates and a planning hori which is generally shorter than the economic of the project. Commonly used indicators financial feasibility are the payback period the return on total or equity investment. financial potential is then calculated simply the sum of all financially feasible projects should add that in the analysis for the minist indeed in most cogeneration work, the payb period is by far the most common indicator financial feasibility; that is simply the numbe years it takes to recover the initial investm based on the net revenues of the project.

1020

Finally, the most restrictive potential is tha implementation market potential. This conc takes into account the fact that not all of financially feasible projects will be impleme ed. This may be due to such factors as financ problems, insufficient capital budgets or sim the lack of information and/or interest on the p of industry or other potential cogenerators.

The distinctions among the various types market potential are of more than acade interest. They serve as a useful guide forecasting cogeneration activity, setting targ and designing policies to counteract imperf tions in cogeneration markets which lead us situations like the top half of that exhibit.

For example, a policy implication of t framework may be the need to narrow the between financial and implementation mar potentials. One may also consider the four ty of market potential as indicators of the l certain and longer-term market opportunit which are defined by technical and econo potentials and the more certain and near-te opportunities defined by financial and imp mentation potentials.

The cogeneration market segments whi were looked at in the recent ministry study summarized in exhibit 2. You will note that t was a two-dimensional framework identify four end-use sectors, with emphasis, as I s before, on the industrial sector but covering a the institutional, commercial and resident sectors. There were three heat-demand cate ries across the columns–low, medium and hi as I will show later–to determine whether th were more opportunities in the more ener intensive, high heat-demand users, which ind is the case; that is, those who use more th 100,000 pounds an hour of steam.

Based on boiler registration data, floor spa inventories and energy end-use studies, h demands were estimated for each cell in t

ıtrix. The technical potential for cogeneration ıs then estimated by selecting particular hnologies and appropriate power-to-heat ra- s for each one of those market segments. Of total technical potential of about 10,000 gawatts, the industrial sector is shown to ntribute about 38 per cent; institutional ildings–universities and hospitals–only five r cent; commercial buildings–these were sically large office buildings–18 per cent; and ge apartment buildings a surprising 39 per nt.

Technical data were then developed based on a al of 66 case studies which pertained to the rious market segments, and these case studies summarized in exhibit 3. For each of the case idies, the technical parameters that were imated included the following: a choice of generation technology and the capacity of the quired equipment, and the incremental capital st for the project. When I say "incremental," I an incremental relative to a no-cogeneration e of energy system, that is, one which would nerate steam only for, say industry, rather than am and electricity.

As an aside, and I will return to this, others luding Hydro have looked at the question mewhat differently and, I would argue, in a s reasonable way in the sense that total costs typically looked at by Hydro rather than remental costs for cogeneration systems; hereas in our more modest analysis, and more alistic one, we are looking at industry to be er time replacing its conventional boilers as ey wear out and replacing them, in the case of am turbines, with a higher-priced, high- essure boiler, which will give it not only steam t electricity. Therefore, the comparison at that int is really between a cogeneration system– am plus electricity–and one which is steam ly. We will get into that a little bit later.

Other data considered were incremental non- ergy operating costs per year for the cogenera- n system, the incremental fuel requirements, amount of cogenerated electricity produced nually and the electrical energy consumption the industrial or other users' facilities to timate the parallel generator sale and/or pur- ase of electrical energy. The analysis of the onomic, financial and implementation poten- ls was then based on this technical foundation.

Let us turn to these analyses and the results. ırning to economic potential first, the econom- analysis was designed to assess the cost- mpetitiveness of cogenerated electricity vis-à- s conventionally produced electrical energy. A public perspective was adopted, as noted earlier, to ensure that the economic limits to cogeneration would not be biased by market imperfections such as the short planning horizons that surround the financial analysis of cogeneration projects.

A project was considered cost-competitive, as I said, if its supply price was less than or equal to the long-run levellized cost of conventional electricity production in Ontario.

Economic parameters included the following: The planning horizon for cogeneration projects was set at 25 years, which is the estimated economic life of a cogeneration plant. The interest or discount rate for the analysis was based on the Ministry of Energy's figure of five per cent, that is, in inflation-adjusted terms. This, you should note, is the hard-nosed assumption, as a higher interest rate or discount rate would enhance the economic cost-competitiveness of cogeneration relative to bulk power generation.

You should also note, in comparison, that federal government guidelines suggest for projects such as these interest rates of seven and 10 per cent, again in real inflation-adjusted terms, rather than the ministry's five per cent. Ontario Hydro uses the lowest rate of all–a four per cent real discount or interest rate.

Energy prices also have to be estimated for the analysis, that is, the cost of energy needed to fuel the cogeneration plant. The supply prices of natural gas and wood fuels were used to measure the economic costs of incremental fuel requirements. These were assumed to equal market prices in the study period.

The market prices, in turn, of natural gas were based on forecasts prepared by the ministry. The cost of wood waste was estimated to be based on the delivered market price which, in turn, was estimated to equal about one third of the natural gas price.

Finally, you should note that the buyback rates at this point in the analysis were not relevant because in a supply price analysis we are interested only in comparing the economic or so-called bricks-and-mortar costs or independent versus bulk generation. Of course, the buyback rates are crucial in the financial analysis, which we will turn to in a minute.

Two sets of results emerged from this analysis. The first is a summary of project-specific indicators, while the second represents an extrapolation of case study results to provide sectoral and provincial estimates of economic market potential.

A summary of these case study results is shown in exhibit 4. Perhaps the most striking feature of the summary is that out of the 16 market categories shown, 14 had average supply prices of cogeneration that were below the economic cost of bulk electricity generation.

The only two that were outlyers were large shopping malls. That corresponds to about 8.3 cents a kilowatt-hour. It is expressed in dollars per megawatt-hour, but if you look at the third line from the bottom, "large shopping malls," it would be about 8.3 cents a kilowatt-hour through cogeneration, which is above the estimated incremental cost of electricity production in Ontario.

The "all other industrial sector" in the low heat demand category is 6.3 cents, which is also above the cost of bulk generation, but every other cell and figure you see had cogeneration costs that were well below the costs of conventional power generation. This is especially important in the industrial sector which, as we will see, has the largest financial potential for cogeneration.

1030

Aggregating these results to the province as a whole showed a total economic market potential of about 3,800 megawatts over the next 15 to 20 years. This is 38 per cent of the identified technical or theoretical potential that I noted earlier. Exhibit 5 provides the sectoral composition of this total economic potential.

Key findings include the following:

1. About 50 per cent of this economic potential is in the industrial sector, 34 per cent in the apartment sector, 12 per cent in office buildings and three per cent in hospitals and universities.

2. Within the industrial sector, the greatest economic potential lies in the pulp and paper and chemical and petroleum product industries where the three industries alone represent about 50 per cent of the sectoral total for economic potential.

3. Again, within the industrial sector, the high-heat-demand category offers the greatest economic potential, accounting for about 76 per cent of the sectoral total. The medium-heat category represents virtually all of the remaining potential.

Let's turn to the more real-world-oriented financial and implementation potentials, that is, what is likely to happen given the current state of market imperfections. In contrast to the economic evaluation, the analysis of financial and implementation potentials will reflect the perspective of the investment decision-maker. The most common yardstick in this perspective is, as I have said, the simple pre-tax payback period.

In the base-case analysis, the financial ma potential for cogeneration was based on th projects whose payback period was shown to five years or less. This corresponds to minimum real pre-tax return on investmen about 20 per cent. But financial feasibility been shown to be not a sufficient conditio ensure the implementation of cogeneration p jects.

Constraints exist to the realization of financ ly attractive projects and opportunities. Th constraints include the lack of information, t is, information available to potential cogene tors, an institutional reluctance to becom power generator and, perhaps as a reflection these factors, the use of very stringent payb criteria for cogeneration. Although no sin criterion can fully measure the scope of t implementation type of potential, what adopted in the ministry's study was a more strictive three-year payback period as a criter for feasibility, that is, using the three-ye payback instead of five-year-payback requi ment that was done in the financial analysis.

There have been some surveys carried out Ottawa by the Department of Energy, Mines a Resources that tried to pinpoint the criteria implemented as opposed to simply the financi ly viable projects. These surveys have pointed three years as a maximum payback period, a there have been other surveys which are ev more depressing in the sense of what paybac are required by industry. These have shown f certain conservation projects that if the inve ment does not pay back in one to two years, it w not be undertaken. Industry seems to be sayin "If we do not get a 50 per cent rate of return, w will not do it."

Other features of this financial and impleme tation analysis included the following: Escalate or current dollar costs were used throughout th analysis. Energy prices were also expressed nominal or escalated terms and reflected mark prices throughout, and electricity prices we specified by end-use sector. Buyback rates we set at 3.45 cents per kilowatt-hour in 1986 whe the study was done–that corresponds to about 3. cents in 1988 dollars–and they were escalated the consumer price index over the study horizon

As in the case of the economic analysis, w obtained two sets of results. The first was summary of project-specific payback periods, a presented in exhibit 6. You will note that only th industrial and the university sectors could mee the maximum payback period of five year required for financial feasibility.

The case study results were then aggregated to :ovide province-wide estimates of financial ıarket potential as shown in exhibit 7. The total nancial and implementation potentials were ıund to be about 1,700 megawatts and 1,350 ıegawatts respectively. The 1,700 was the nancial potential and 1,350 was the more :strictive implementation potential. These rep- :sented 44 per cent and 35 per cent of the :onomically justified potential shown earlier. ther findings from this analysis included the ıllowing:

First, industry is shown to contribute almost)0 per cent of both the financial and implemen- tion potentials. It accounted for, you will call, only about 38 per cent of the theoretical or chnical potential.

Second, within the industrial sector, three arket segments–again, pulp and paper, chemi- ıls and petroleum products–accounted for over) per cent of the sectoral potential.

Third, also within industry, 70 per cent of the ıancial potential and 65 per cent of the ıplementation potential stem from the high- :at-demand category.

Finally, the only nonindustrial market seg- ent with any financial potential at all is the ıiversity group. The nonindustrial subsectors as whole accounted for 50 per cent of the :onomic potential but less than one per cent of e financial potential.

A summary of the various types of these timated potentials is shown in exhibit 8. It ves you a quick overview of the difference :tween what is technically, economically and ıancially viable. You can see on this exhibit at the technical potential of 10,000 shrinks to ıout 3,700 megawatts of capacity which is onomically feasible and under 2,000 mega- atts, something like 1,300 megawatts, for the ıancial and implementation potentials.

An immediate policy question which arises is ıw one could reduce the gap between the ıancial and implementation potentials and ose that were shown to be viable from a ovincial or economic perspective. Indeed, I ould go further. Another policy question I will turn to at the end of the paper is how we could alize what is financially viable according to the ıalysis; that is, even what is shown to be ıancially viable may not be realized unless rtain steps are undertaken.

A comparison of these results with earlier timates of market potential is contained in the llowing exhibit 9. This shows that our esti- ates in the 1986 study, as updated recently, point to a far larger market than those estimates provided in earlier studies.

A more valid comparison would focus on the industrial markets alone, as the earlier reports analysed only the industrial sector, and if we use the single-sector comparison, we will see that our estimates of market potential are above the earlier figures in the case of economic potential, and at the upper end of the earlier estimates in the case of financial and implementation potentials.

It is also interesting to contrast Ontario Hydro's latest projections, which point to a cogeneration potential which is the smallest among all of the estimates prepared within the last five years and show a fairly wide range in terms of financial– I am making a reasonable guess at what Hydro's definition was from the reading of their documents. It really is a financial potential they are talking about, although there are times when they switch from one type of definition to another. Their financial potential has a very large range of 150 to 1,000 megawatts.

1040

Let's turn to the impact of alternative buyback rates to see how sensitive this analysis is to the financial price, the buyback rates that a co-generator could get for his surplus power.

At current buyback rates, and those used in recent studies, large industrial cogenerators could in theory employ either a steam turbine or a gas turbine technology, with approximately equal degrees of cost-effectiveness. In practice, however, large industrial applications of co-generation, particularly in the paper industry, are generally based on steam turbines for a number of reasons, including lower investment costs, greater degree of technical simplicity, a wider choice of available fuels that can be used in the cogeneration plant including wood wastes and other forms of biomass, which is not the case with gas turbines; and finally, less or no surplus power generation and hence less need to negoti-ate sales contracts with Ontario Hydro. This has been an important factor in our surveys of industry, and I will return to this as well, which has perceived, rightly or wrongly, Ontario Hydro is less than enthusiastic about cogeneration. They, as a result, do not really want to get into, if they can help it, a surplus power situation where they have to start dealing with the utility in addition to their own in-house problems.

There is another bit of technical jargon on this surplus power generation. I should note that the steam turbine technology, which for so long has been favoured by industry, has the lowest power-to-heat ratio, followed by gas turbines and

diesels. What this means is that using steam turbines, one will generate as much steam as the industrial plant requires, and the amount of electricity that is produced is a residual out of this cogeneration process and will be the lowest amount of electricity that you could produce out of any or all of the technologies that are available for cogeneration. In other words, by choosing a gas turbine or, in smaller installations, diesel engine technology, for any given amount of steam that you produce you will get a lot more electricity; it will be more costly, but it will give you much, much more electricity as the byproduct, if you will, of this system.

As the buyback rates are raised, and this is just a hypothetical analysis that we wanted to carry out, the gas turbine technology and the generation of surplus electricity become more attractive from a financial point of view. At higher buyback rates, then, there would be impacts on the financial and implementation potentials in two ways. First, the industrial and building sector projects based on gas turbines or diesel technologies and generating excess power would become financially more attractive as the surplus power fetches a higher price. A second and larger impact is that there would be additional industrial cogenerators who would be encouraged to use the gas turbine technology to generate the surplus power that would not have been the case with the steam turbine technology. In both of these cases, the impacts on potential are positive, serving to raise the financial and implementation potentials for cogeneration.

Based on these considerations, two simulations were carried out with respect to buyback rates. In the first, buyback rates were increased by a modest 20 per cent, involving no change in the mix of base-case technologies. In the second simulation, the buyback rates were raised by about 50 per cent to six cents a kilowatt-hour in 1988 dollars with an associated switch to the gas turbine technology among the large industrial firms, as well as increased revenues to those firms that have already been using gas turbines and generating some surplus power.

The results of this analysis are summarized in exhibit 10. You will note that the modest 20 per cent increase in buyback rates raised the financial potential by only 4 per cent. In contrast, the 50 per cent hike in rates had the estimated effect of roughly doubling the size of the financial and implementation potentials.

The base-case rate that was adopted is the 3.8 cents, through that exhibit. The 4.56-cent rate represents a 20 per cent increase, and the 6-cent rate is the 50 per cent increase in rates. T corresponding potentials are shown in the app priate rows.

As a footnote to the 6-cent rate–although I a not, in the presentation itself, going to get int discussion of how these rates should be set what their magnitude should be–this is not outlandish figure given the incremental cost power generation in Ontario. Compared to t actual prices paid by commercial and lar industrial users, which is about 5 cents, or 4 cents in the case of large industrial users, it is n outlandish, especially when you take into a count that the 6 cents should be based on incremental, avoided-cost concept, and t actual prices paid by industry and commerc users are based on average costs, embedd costs.

Given this analysis, what can we conclu about the future for cogeneration? The mark opportunities are clearly substantial. The should be no debate over that. Depending on t choice of investment criteria, 1,300 to 1,7 megawatts of cogeneration capacity are fina cially feasible in the industrial and buildi sectors. Based on a provincial perspective a the life cycle cost analysis of the econom potential, an even greater amount, 3,800 meg watts, could be developed cost-effectively. T financial and implementation potentials a highly sensitive to buyback rates, with 3,3 megawatts and 2,900 megawatts shown to feasible using a buyback rate of six cents kilowatt-hour and payback periods of five a three years, respectively. The issue is therefo not whether there are market opportunities b rather how these could be realized over t coming years.

I would like to suggest in conclusion, ve briefly and in a general way, four of t ingredients that I think are necessary to reali the full potential of cogeneration.

1. Innovative marketing: Suppliers of cogen ration equipment and services have the necessa technical knowhow to plan, design and impl ment cogeneration projects. The missing ingred ent in many cases is the marketing of these goo and services in a way that meets the client needs. In many cases, these needs will pertain innovative financing that does not require th energy user to dip into a limited capital budge For example, savings financing is one means th could be used to fund projects, with the supplie compensated out of the energy savings and sal revenues accruing to the customer organizatio

other words, it would not require the potential generator to put up any capital dollars.

2. Industrial and institutional commitment: ith the help of government and Ontario Hydro tiatives, industrial and institutional energy ers could promote in a greater way cost-ective cogeneration within their own organi-ions. If one is already dismayed by the idence that three-year paybacks are often quired of energy productivity investments, one uld be shocked that at times even projects with ee-year paybacks–that is, 33 per cent rates of urn–will fall short of implementation. In this gard, demonstration projects may be the most ective means of creating industry-wide aware-ss and commitment.

Another term I did not put in, but which is portant, is a kind of follow-the-leader mentali- which we have in all organizations or ustries. This is where the demonstration ject would be a very effective means of couraging more active cogeneration develop-nts.

3. Ontario Hydro commitment: Surveys car-d out by myself and other organizations have own that industry perceives Ontario Hydro to less than enthusiastic about cogeneration. To extent that Ontario Hydro has taken some ganizational and financial steps to encourage generation, the perception is not entirely urate.

None the less, I would add that much remains be done, in particular in the implementation of nore integrated supply/demand-based invest-nt planning process; and even more impor-t, the design, in consultation with industry and vernment, of equitable buyback rates–I em-isize "consultation with industry and govern-nt" because otherwise the rates will not have dibility–based on avoided costs; and finally, re work on the active promotion of economi-ly desirable cogeneration projects, that is, re work on the part of Hydro to promote these jects.

50

The last point is government leadership. Most portant, and I think this committee is a good mple, the government should send signals to interested parties, industrial and institutional rgy users, suppliers of equipment and ser-es, as well as electric utilities, that it is serious ut cogeneration.

Government policies and programs should ress the information gaps, the uncertainty and perceived risks associated with cogeneration estments and the question of buyback rates I have already mentioned just a few minutes ago. Initiatives should include information and publicity programs and demonstration projects, all tailored to specific subsectors where the gaps between economic potentials and implementation potentials are the greatest.

At the same time–and this is a very important point–the government should provide some policy direction–I am not in a position to tell you what that should be; I have some general ideas on the subject–to Ontario Hydro to ensure that Hydro's power sector planning, including the issue of buyback rates and the issue of avoided costs, is in accord with a least-cost energy future for Ontario and a least-cost future to which cogeneration, I believe, could well contribute.

Thank you very much. At this point, I am at your command as to how you want to proceed.

Mr. Chairman: Some members of the committee have questions.

Mr. Dietsch: You mentioned just at the end of your presentation that you felt this government should be giving some type of direction and you say you have some comments in that respect. I would be interested in hearing what those comments are.

Mr. Diener: There are really two types of direction I am thinking of. One is to lay out, if you will, a policy framework, that there are certain government policy initiatives which Hydro should clearly be aware of. I am not saying Hydro should be led by the hand, but it should not be operating without knowledge of these policy directions.

Another and I think maybe more important form of direction–maybe that is the wrong word to use–refers to the review and consultation that are involved in Hydro's investment planning process. That transcends cogeneration. It is more than just independent generation. It affects demand management options. There is energy conservation potential and activity which is far from where it should be in the province.

In this sense, I think the direction should consist of some organization or body, perhaps the Ontario Energy Board, representing the energy sector rather than the power sector–and there is a big difference–when Hydro's plans are put forward which will look at those plans in the context of overall energy sector economics and planning.

A good example of this is the buyback rates offered currently to those who use biomass fuels and those who use natural gas. There is a huge gap in the buyback rates offered to these. I am not sure how they were arrived at–I would say I am

from Missouri and I want to get a handle how these are arrived at–but to me it seems clear it is a power sector, electricity perspective that we do not want to encourage natural gas, so if you use wood waste or dung or whatever to power your project, you are going to get a much better rate than if you use natural gas. The economic rationale of that escapes me.

That is an example of these kinds of issues, and they are not all issues of Darlington and large project planning, although they will affect it. Simple buyback-rate questions should not be set or addressed unilaterally by Ontario Hydro.

Mr. Dietsch: Do you feel there should be some other entity that is looking at that process that keeps Ontario Hydro, if you will, in its perspective and government in its perspective? We had a deputation before us–last week or the week before, I am not quite sure which–in terms of making a presentation from a committee out there that looks at things from an objective point of view, from a distance. Is that the type of thing that you are really alluding to?

Mr. Diener: Yes. That is exactly it, someone with a wider perspective than Ontario Hydro. I do not mean to be critical of Ontario Hydro because I do not think it should be concerned about Ontario's energy future. They should be concerned with Ontario's electricity future within the bounds of some policy direction provided by others.

There is a real need for an outside group. I am not sure it should be one group or one group with the help of others. The Ontario Energy Board is one that came to mind. It would certainly satisfy some criteria, but even it would require some inputs from energy users and various affected parties in the reviews of Ontario Hydro's plans.

Mrs. Sullivan: The first question I want to ask relates to the technical potential chart. Does the technical potential include transmission and hookup? Is that part of your criteria?

Mr. Diener: Yes and no. The technical potential is based on how much could be put into place without regard to what the payback will be or how cost-competitive that project will be. We just take the steam demands of all users, the energy demands in Ontario, beyond a certain size to make it technically feasible and add up how much electricity would be produced if cogeneration were miraculously put into place in all these installations.

The transmission question comes into play on the cost side. That is, when we are making comparisons of how much cogeneration-based electricity will cost against bulk generation, it is important that it is an apples-and-apples typ comparison in that if you look at the deliv price of electricity, which includes transmis distribution in some cases, then it needs t compared with the delivered price of cogener electricity. Conversely, if you look at plant-gate cost of cogeneration, then the com ison should be also with the bulk genera before we take into account the cost of trans sion and distribution.

Mrs. Sullivan: I was thinking that withou transmission being included in the techn potential on a comparative basis the pote really is, to a great extent, related to subtrac of the load in Hydro's planning rather creating additional supplies. Once you put in transmission, then you are looking at an addit al supply, but that is a different–

Mr. Diener: You are right. It is a good po We have elements of new supply and repl ment in that technical potential, aside from question of the transmission lines, because s of those cells include facilities that are such they would have no excess power, and this is case in many of the industrial projects. T would be simply cogenerating electricity displace or replace what Ontario Hydro providing to them.

In other cases, there would be surplus po that would be sold to Hydro. As such, it is a m obvious type of new supply. I think both savings type and the surplus power should looked on as sources of new supply in the sa sense as conservation measures represent supply, to the extent that it is new supply need not come on line because the demand for energy type, in this case electricity, has b reduced.

1100

Mrs. Sullivan: Do I understand your con sion is that the buyback rate should be equiva for all resources in cogeneration?

Mr. Diener: Yes. I really do not see what source has to do with the buyback rate in buyback rates should reflect the long-run avoi cost. The value of the cogenerated electricity is produced is really the cost savings that re for Ontario's power sector system. It is avoided cost that buyback rates should be ba on.

On the question of how that cogenera designs his plant, it is almost like telling h what kind of technology he should use. It really, I would feel, independent of the buyba rate. It is a red herring of sorts. I heard argume

it was based on reliability questions. That one rationale for discrimination between mass and natural gas. Even if that were the e, I am not convinced there is a difference in ability. If anything, it may go the other way, n depleting biomass sources available to some enerators.

am not sure that even if there were a erence in reliability, what that would have to with the gas, because you can assure tractually that the gas will be there for 10 rs, 15 years or whatever the contracts are ned.

Mrs. Sullivan: However, would there not be ater potential, and then possibly greater value n time to time to Hydro, of cogeneration that add to the supply, say, at peak? Do you think e is a value in putting a premium on that?

Mr. Diener: Yes, I think there would be a ue in that. I am just trying to work through the lysis in my mind as to how they would get at timing. I suppose that if there were surplus-nted savings, one could ascertain how much reduction that would represent in peak power uirements.

n fact, this would be one of the steps in setting appropriate buyback rate because you are not y saving in terms of fuel requirements for dro, but you are helping to avoid or delay ital spending on new plants by Hydro and new acity by having reduced demand for your tricity.

Mrs. Sullivan: Mr. Chairman, if we have e, I would like to ask further questions about ancing.

Mr. Chairman: We have a fairly long list. s. Grier.

Mrs. Grier: Thank you. I just wanted to be e of the target year in your conclusions when give the estimates of 1,300 to 1,700 ential. Are you talking about the year 2000?

Mr. Diener: Yes.

Mrs. Grier: I appreciate your argument about e being no difference in the buyback rates ween various type of fuel, but we had a very resting submission from Dow Chemical, ich pointed out to us that it has three gas bines and one has been down since 1983. They at the point of deciding whether or not to urbish it. For the cost of $7 million, they could urbish and contribute 87 megawatts to the d.

But their recommendation was that there ded to be in the buyback an escalation clause ted to fuel costs. I am wondering what that does. If you accept that that seems to make sense, how do I reconcile that with your recommendation that there should be standard buyback rates?

Mr. Diener: What I was referring to with the standard buyback rate was that it should be independent of the type of fuel used. It should certainly not be fixed over time. There is no justification for saying that whatever that 1988 cents per kilowatt-hour figure is, it should be held fixed for the next 12 or 15 years or whatever. There is some provision now in Hydro's buyback rate to escalate by the consumer price index. I am not sure; that may be the simplest way to do it.

I think a more rigorous analysis would be called for to relate what the buyback rate is, say, five years from now to what the value of electricity is in that year. You almost have to re-examine the buyback rate, have a fresh start on it periodically, to see whether its value has gone up more or less quickly than consumer prices, for example. I think that is a very important point that the gentleman from the chemical industry made.

Mr. Charlton: In the analysis you did, when it comes down to the bottom line in terms of the economic potential and the implementation potential, you have approached, as you said, from the perspective of three-year and five-year paybacks on the basis of what is or what should be financially attractive for a private sector investor. I think we all understand that.

From the perspective of government, though, and from the perspective, ultimately, of Ontario Hydro and what the government directs Hydro to do or what Hydro may decide to do on its own, to what extent would it be useful to look at the question of Hydro's payback periods in terms of new supply versus the cogeneration potential and government looking seriously at investment policies to equalize, in fact, that range of differences between the three-year and five-year payback periods that you have looked at as being economic and financially attractive versus Hydro's much longer term?

Mr. Diener: That is really not a very favourable comparison for Hydro to make. We have attempted that comparison, I think with the same kind of conclusions, in a somewhat different way, through the question of supply prices. That is, what is the levellized cost of electric power through cogeneration compared with bulk generation alternatives? I think it is the same. We would have the same type of objective as if we were doing it through the payback type of analysis.

The conclusions would be similar to the effect that electrical energy produced through cogeneration is a hell of a lot less expensive, in most cases, from this provincial perspective, excluding taxes and using correct interest rates and so on, than the cost of electricity through bulk generation undertaken by Hydro. The 3,800 megawatts is really a conservative estimate of what would be economic; in other words, what the amount of electricity that could be produced more cheaply through cogeneration than by Hydro would be. There are a lot of major power stations in that 3,800.

Mr. Charlton: Yes. I understand that. That is a valid comment. I think what I was getting at, though, is that some things are not financially attractive only to private sector investors. In the package between what is, on the surface, economically viable and the technical potential, there is a whole range of different prices, as you have suggested, that are going to fit in there.

1110

Does it make sense for the government in this province to look at a program which, for example, would take a cogeneration potential which, if you just took it as a private sector investment with a three-year payback, it may require a seven-year payback; for the government to look at an investment to the extent of ensuring that the private sector investor gets his three-year payback and look at it from the perspective of all of those increments of cogeneration which, if the government invested in some small portion just to reduce the payback period, would, in fact, save money in the context of public sector investments?

Mr. Diener: I did not quite answer your question. I think that would show just what you are suggesting. There would be merit in that type of analysis, to look at the financial analysis almost like a bunch of T accounts of who is winning and losing from the different interested parties. Government contributions to making more projects meet the three-year payback would certainly be more than offset by the cost savings. I could not give you the figures now. I think that analysis should be beneficial to them.

Mr. Charlton: On that question, based on the data which have been pulled together through your study and whatever other data exist, how long would it take us to have a consultant put together a financial analysis of what would be useful and productive for the government to invest to move into that range between what is in your study economic and that technical pote tial? How long would a study like that take?

Mr. Diener: It would be hard to estimate. It a consultant's nightmare always, to try estimate these. I can give you a range, I suppos because the data are largely available. I wou say anywhere from 10 to 50 days of time wou give you some indication.

Mr. Runciman: Somewhat along the sar line, you mentioned the government or Ontar Hydro, I am not sure which, getting involved ir demonstration project. You said that despite t three-year payback, industry does not seem to too enthusiastic about getting involved in the kinds of projects. What kind of demonstrati project were you visualizing and how would y see it financed? Would you see Hydro or t Ministry of Energy playing an active role in tha

Mr. Diener: The type of project should be an area where there is a lot of potential, first, a that is the industrial sector. I would also pick group of companies which represent, in a sort technological sense, opinion leaders; their pe group is going to look up to them. That h worked in the conservation type of setting whe if a company which is looked on as bei innovative is the one approached and agrees the demonstration project there is a better chan of others following their lead.

The kind of financing would be really speci to each situation. What I suggested on savin financing may be an alternative which attractive to a lot of industry, but there may some who feel they want to be able to get 100 p cent of those savings and not use the savings pay for the capital cost of the investment, whi is really at the guts of the savings financi scheme.

The choice of who is to encourage that co not really be decided until there is a cl indication of who is in charge and in what way independent power generation and for the wh scope of power sector planning, as we w discussing earlier. If part of the direction t Ontario Hydro received from some outside bo was to undertake demonstration projects o certain size and by a certain date–I am talki fairly concrete suggestions and not the acaden variety–then Hydro could well be the agency t implements those policies and would get down the nuts and bolts of arranging–and it knows customers as well–which ones should be t candidates for the demonstration projects.

Mrs. Sullivan: Relating to demonstrati projects, am I incorrect in assuming that m industries that are going to be participating

eneration projects are fairly large industries that therefore the capital cost, even of a nonstration project, is going to be fairly stantial? I understand that there are indeed ne demonstration projects or joint ventures ween Hydro and pulp and paper companies, tainly in northern Ontario.

Whereas in terms of, say, parallel or independ it generation we have certainly heard comnts about the difficulty of financing, we have heard that as much in terms of the larger ustries involved in cogeneration. Maybe that ust because we are starting this topic now. I nder why you think that for large industry a ings-financing program, for example, is essary.

Mr. Diener: I am not suggesting I have veyed all of these people. For the large ustries I have talked to the financing has been issue, and surprisingly so, because as you te, a large industrial firm would have relativelittle trouble lining up the financing from its n internal funds. What you find is that generation and energy management in general a low priority; so they would rather undertake ojects in other areas that will have a higher yback period and lower rates of return, in new oduct development or capacity additions, for ample, than in cogeneration or energy manement. It is a lower priority, so it is budgeted little that by the time they reach a two-year yback as they work down their proposals, they ve exhausted the budget and are still looking at e- or two-year payback projects.

Mrs. Sullivan: In your experience in talking these larger companies, you are finding that ey are not going to the capital markets for generation financing?

Mr. Diener: They are not interested in generation enough to approve the project. In t, they will not even reach that stage. When it evaluated, it will not reach the approval stage many cases because its payback is over three ars. They do not even get to questions of how ey would finance it. A lot of two- and ree-year payback projects in cogeneration that e approved and feasible will be in a position to ach this financing problem of whether to go tside for financing or to get savings-financing om their own retained earnings. Unfortunately, any projects do not even reach that stage.

Mr. Passmore: Mr. Diener, you mentioned is question of cost competitiveness in the ntext of the value of power, and you ran a nsitivity test using a figure of six cents a lowatt-hour. Is that a totally arbitrary figure, or did you feel that this was somehow a reasonable representation of the value of power in terms of new generation?

Mr. Diener: I think it certainly would be close to it; it may even be lower in some cases in relation to the cost of new bulk generation facilities that are contemplated by Hydro. In 1986, there were some figures that no one wanted us to quote–they were not part of our terms of reference; they were kind of lying around ministry offices and elsewhere–as to what different people's views were on incremental power generation, and in terms of 1988 dollars it would be pretty close to that figure of six cents.

1120

I think that is another area, as per the gentleman's suggestion, in looking at the financial implications of supporting cogeneration projects. I think the appropriateness of buyback rates is one that deserves additional objective study.

Again, it is not one in which you would want to rely strictly on Ontario Hydro. It should be more of a consultative process. But it was not picked arbitrarily. I do not think it is outlandish at all in terms of reflecting the long-run cost of avoided power or new generation facilities.

Mr. Passmore: Supposing the government then established a policy which suggested that this was a rate that it wanted Hydro to pay to parallel generators. Would that overcome this problem that you have pointed out in terms of demonstration projects?

In other words, could a policy initiative obviate the need for demonstration projects? I assume that when you are talking about demonstration projects, you are talking about demonstrating financial mechanisms rather than demonstrating the technology because the technology is well proven.

Mr. Diener: Yes.

Mr. Passmore: Would a six-cent rate still require financial feasibility demonstrations, or would that encourage industry to be more aggressive?

Mr. Diener: No. I think that would go a long way to obviating a need for other types of incentives for demonstration projects. In talking to engineers, just in the last few weeks, who are involved and active in cogeneration, they kept emphasizing what wonders could be performed at a more reasonable buyback rate.

Then I bounced the idea of the six cents off them as well because they are dealing with potential cogenerators. They are trying to sell

their services to get cogeneration work. They felt that it would certainly go a long way to getting the companies interested, or the institutions interested because not all of them are in the private sector.

Mr. Passmore: You mentioned this question of backing out of purchases versus surplus power. There is a concept known as simultaneous sale and purchase, which I think is instigated or is a mechanism used in the United States. Were you alluding to some sort of initiative similar to that when you talked about the fact that backing out should be treated in the same way as demand management initiatives, as a new source of supply? Could you comment on that?

Mr. Diener: No, but I really should have because I am familiar with the US definition of how that is considered. There is no reason why it should not be the same concept that would apply here. If you get an appropriately defined value to the power that is cogenerated and an appropriately defined buyback rate, that is what should be used for all of the cogenerated power that a firm produces.

Mr. Passmore: So not one rate for backing out and another rate for surplus, but the same rate for all of the cogenerated power?

Mr. Diener: Yes, I would think so, because in the end there is one value to the electricity. It is not like it is two different commodities.

Mr. Chairman: Mr. Diener, I would like to thank you for coming in today, appearing before us and presenting the papers that you have prepared. I think we have had an interesting discussion here and we appreciate your coming in.

I wonder if I could ask the next witness, Sceptre Resources, to come forward. The materials that will be spoken about today were delivered to the committee yesterday in this brown, unmarked envelope. I got excited for a minute that I was given some secrets, but it turned out not to be the case.

Mr. Haberl, I wonder if you just might introduce yourself to the committee. I am not sure if part of your presentation will be briefly telling us a bit about your company. I know there is some material in the documents you gave us, but you might spend just a couple of minutes telling us about your company, to give us the context from whence your comments are coming. I will turn the floor over to you.

SCEPTRE RESOURCES LTD.

Mr. Haberl: Good morning. My name is Steve Haberl. I am with Sceptre Resources. Sceptre's interest in this review comes from th aspect of being a fairly large independent oil an gas producer. From that aspect, we have taken a interest, really only in the last year, in natural ga in the electrical sector, in gas cogeneration an direct power generation. I am here this mornin simply to give you our views on natural gas i that sector, discuss a little bit about ou experiences and, from that, open the floor up t questions.

I am going to go through four overheads which you all have copies of, I believe. I will ski through some of this stuff. I will certainly ski through all the financial and statistical informa tion. If there are questions there, I will be please to respond to that.

The first slide, going right to the last statemen on it, says that over the next five years ou company will be emphasizing natural gas explo ration and development. We expect to double ou production in that time frame. We will b marketing our gas to a mix of consuming sector including the electrical power generation secto throughout Canada and the United States.

This next slide is really our views on what w have learned about the electrical power industr in the last little while. Our observation is th power requirements in North America a continuing to grow. We also observe that Nor America is tending towards what we call high-tech or electrically oriented business manufacturing and moving away, to a certa extent, from fossil-fuel-hungry heavy industri –the smokestack industries, as we have calle them over time–although those industries, pa ticularly in the United States, seem to be turnin more and more to cogeneration, a lot of that fro natural gas, as a way to offset some of the current economic problems.

Another important fact to point out is th environmental aspects have prompted sor jurisdictions in North America to actually intr duce legislation and ask utilities to really clean the air and turn to cleaner energy, such electricity and natural gas. Later on, I will through an example of that, our own experien with a Boston-area utility.

With regard to the nuclear power sector in t United States, our observations are that there quite a bit of concern over nuclear power in t US. For example, the Shoreham facility on Lo Island is being decommissioned. The Seabro facility in New Jersey is in a questionable state this point, I understand, as to whether it w come on line or not. The third example I a aware of is the Midland cogeneration plant

chigan, a conversion from a nuclear facility in t state.

Again, pointing out the bottom-line statement e, we feel that the private sector gas-fired gen and even smaller scale utility-owned ver plants converted off of coal or oil offer the ity an ability to respond quicker to market d, to plan more effectively and perhaps to ite some of the problems and risks associated h long-lead-time megapower projects, such as jor nuclear plants.

30

Now a little bit into natural gas itself. There ve been some concerns raised about the iability of supply and future pricing of natural . I would like to address some of those.

Western Canada currently produces about ee trillion cubic feet of natural gas per year. ore than 20 per cent of that is consumed in tario. In our view there remains today about 0 trillion cubic feet of economically recovera- gas reserves in western Canada. I should int out that those are at today's prices. If we see me price increases down the road, I think that mber could be more like 300 trillion cubic feet.

Getting into some pricing–this is current gas ices–just really to go through, by example, om wellhead to burner tip in southern Ontario, e average Alberta wellhead natural gas price day is approximately $1.60 per million BTUs. oving that gas through the Nova Corp. of lberta system in Alberta is about 20 cents. rough the TransCanada PipeLines Ltd. system ross Canada into southern Ontario is about other 80 cents. Distribution cost is roughly 30 nts.

I should point out that these are assuming a gh-load factor, essentially a 100 per cent load ctor, natural gas sale. Pipeline transportation tes are paid on a demand-commodity basis, so you are underutilizing the pipeline you still pay e full demand charges.

I should also point out that from other formation I have seen from Ontario Hydro, eir 1988 price is roughly $5.08 per million TUs. Also, they project pretty significant ices in natural gas down the road.

With regard to the $5.08, I am not too sure here that particular number comes from. It may e related to a residential price that is currently aid in Ontario and Quebec, which is roughly at range, but the big differential between the 2.90 and $5.08 for a residential price would e primarily distribution cost. Again, for high- ad factor, large-volume sales, these particular prices are quite a bit more reflective of today's situation.

In terms of what will happen in the future with gas price, of course it is always difficult to determine what the future will be. I think that one of the influences will certainly be the US gas supply and demand balance. The US produces and consumes roughly 10 times the amount of gas that Canada does. It clearly will have an influence on the economics of natural gas in this country.

There will also be other influences–competing fuels, such as coal, oil, and I put in here electricity as well, which I tend to believe is going to be a bit of a trendsetter and even has the potential to rise faster than the price of oil. That is one reason Sceptre is looking to at least supply some of its gas into the electrical power sector.

The last statement on this slide which I think is particularly important is that gas supply and price stability can be secured through long-term market-responsive contracts. On the next slide I will go through a couple of examples of that.

Some of our recent experiences: The first experience here is we have entered into an agreement with Northland Power, which is a cogeneration developer, to supply gas to a cogeneration facility in northern Ontario. Our company will be supplying about five million cubic feet per day or roughly 70 per cent of the gas supply that is required for this 4,500 megawatt cogeneration facility.

The contract we are entering into at this point is a 20-year contract starting in late 1989. The pricing for that contract is one that reflects today's current competitive price, and that price will be indexed to Ontario Hydro's industrial power rates in the future. That gas contract is tied directly to the price of power in this province.

A second example and a more recent one, and one that we are actually still negotiating–we have entered into an agreement with them; we are still working on the contract–is to supply roughly 20 million cubic feet per day, or 35 per cent of the gas supply, to a variety of power plants owned by a large Boston area power utility. That is a contract that will run for 20 years, and we expect that to start in late 1990, subject to gas transportation being available at that time.

This one I found particularly interesting in that one of the reasons this company is turning to gas is really the acid rain legislation that has been introduced in Massachusetts. One of their plants, anyway, is currently burning oil. The government has come in and said that it has to be cleaned up, so they have looked at several alternatives.

One is to clean up the oil or coal. Another alternative is to look to natural gas. They have chosen natural gas as their alternative and western Canada as the area where they will get the majority of the gas supply.

The pricing formula on that contract is one that is both–it is hard to do both at the same time; I will try to explain it–partially responsive to the average price of gas in western Canada and partially responsive to competing fuels in their particular area. We really went into it and said Sceptre would like a gas price that is reflective of what happens in its backyard, in Alberta, and it would like the same for its end, so we simply put the two together. That pricing formula adjusts on an annual basis to ensure what we have called here high dispatchability. In other words, it adjusts up or down to keep the particular power plants moving at a high rate. It will probably be dispatched ahead of coal or oil.

There are other cogeneration projects that we are working on. We have been approached by numerous companies, many in Ontario and also–many more, I might add–in the United States. We are looking at quite a few different alternatives. These are all hedging mechanisms to try to hedge against what future price uncertainties may lie out there. One is prepaid gas. This is one where the cogeneration developer has come out and offered to pay for proven developed gas reserves in advance, pay the whole tab right up front. We would simply then just operate and maintain the gas reserves, handle the transportation and so on.

Other things we are looking at are joint venture exploration projects with the power utility or the cogenerator. The other end of the spectrum is for us to participate on an equity basis with the cogenerator in his facility. Those are things that are being looked at. There are many different variations on a theme in terms of price indexes, gas formulas and so on. We are looking at locations to supply really right across North America.

One last thing I thought I would point out as well–I just got this information this morning–is that the United States northeast market area is one that is going to be turning a lot more to natural gas than it has in the past, and a lot of that gas will be coming from Canada by the early 1990s.

1140

At the end of last month, we had a deadline to submit requests for transportation starting at the end of 1990 to TransCanada PipeLines, the major pipeline across Canada, so that it wo have sufficient lead time to plan its system.

I found out this morning that they have requests for gas flow to the United Sta northeast exceeding 500 billion cubic feet day, which is roughly the same amount Ontario currently consumes. We can see that the early 1990s, there will be basically twice much gas flowing right through Ontario as th is right now, moving on its way down into the northeast. Things are really turning around the gas industry. I should also add that a perhaps the majority, of that gas supply destined for cogeneration and power generat in the New England area.

That completes my brief presentation. Perh the best thing to do now is just to answer so questions.

Mr. Chairman: Certainly. Are there questions from the committee?

Mr. Runciman: I am just wondering ab your projections with respect to the 50-y supply. I guess I have to go back to the first slid

Mr. Haberl: It is about 50 years.

Mr. Runciman: Yes, a 50-year supply. Y have just mentioned 500 billion cubic feet day going to the US, and we are talking ab increasing cogeneration in Ontario and a numl of other jurisdictions. You are talking ab current consumption levels when you talk abou 50-year supply. Obviously, the trend is significant increase. Have you done any calcu tions in that respect?

Mr. Haberl: No specific ones. There is a of speculation on how much gas from west Canada will end up being exported to the Uni States. Currently, we export a little over a trilli cubic feet. I guess my personal expectations that it could double or triple over the next deca To do so would require building or expandi some existing pipeline systems. Some of th are already under way.

The reason perhaps for that kind of conclusion is based on my perception of sup and demand in the United States. We curren supply five to six per cent of the United Sta market from Canada; yet in terms of economic ly recoverable gas reserves, we are probably the order of 15 per cent of North American supply. It seems to me that over time, if 15 cent of the gas supply is available here, then per cent of the gas supply should be export That is why I see a tripling of exports to United States.

Mr. Runciman: You talked about the US–I ink it was Massachussetts–conversion of a ajor oil-fired plant. What are the cost compari- ns in terms of coal, oil and natural gas? Is gas gnificantly more expensive in terms of power :neration than coal-fired or oil-fired?

Mr. Haberl: No. As a matter of fact, I am just ying to recall the numbers they showed us, but I :lieve that natural gas from western Canada can : competitive with landed oil in the Boston area. deed, our pricing formula at least partially flects that. Coal is cheaper than oil or gas in rms of landed cost.

Offsetting that, and one reason I am encour- ;ed by that particular contract, is that the oil, ıd maybe even more so the coal, has to be eaned up. They probably have to make gnificant capital investments to clean up those els, whereas natural gas can simply go straight the burner tip.

Mr. Runciman: I am trying to relate it to the ntario situation with the coal-fired plants and e acid gas emissions. Has any effort been made take a look at the conversion of the coal-fired ants in Ontario to natural gas as far as your ompany goes.

Mr. Haberl: No, I have not looked at that. To : frank about it, I really have not got into any of e economics of that. It is certainly a viable ›lution.

Mr. Runciman: This certainly creates a ıestion, because with all the talk about install- g scrubbers, etc., from a personal point of ew, it would be interesting to see what the cost ›mparisons would be.

Mrs. Grier: I want to cover some of the same ·ound Mr. Runciman has, because while Hydro the study we are reviewing acknowledged that ıtural gas is currently the least expensive fuel, e were told it was not attractive to produce ectricity in the long run. If I could read you a ›uple of sentences from that study, I would be ally interested in your comments, because what ydro says is as follows:

"Currently, due to a surplus in the US, and :ry low oil prices, natural gas prices in the US ıve been depressed below the average finding ›sts. Despite the surplus, the adequacy of future ·oduction and recoverable sources of natural ıs in Canada and the US is highly uncertain. dditions to known reserves...and development frontier sources will be critical for future ıtural gas supply, both in Canada and the US. hese new reserves, however, will be more ‹pensive than conventional gas reserves, and natural gas prices are expected to be again under strong upward pressure in the 1990s."

Would you agree basically with that?

Mr. Haberl: Strong upward pressure in the 1990s, I think, will be if the market will bear it. If part of that market is the electrical sector, then the electrical sector is going to set the price for natural gas. I do not think the gas supply will necessarily set the price. That may be so to a certain degree in the United States but certainly not in Canada. As we are a much smaller supplier of gas to North America, I think we are going to follow the trends.

Our company's perspective is to have our natural gas go to a variety of markets and to a variety of market sectors across North America. At this point, I do not know whether the price of gas or electricity will flare up or not, so my strategy is to have a little bit of my gas in a variety of markets.

The observations from the past are that when oil and gas–and they typically track each other; we have seen the OPEC oil price increases in 1973 and 1979–flared up, for each flare-up there has been an equal one opposite, a downward pressure on the price of oil. Oil and gas prices may tend to be erratic over time, but they will generally increase in tandem with the price of all energies set by the marketplace. Electrical prices may have a fairly smooth increase over time and the other ones may go up and down, but I think on a 20-year basis, if you took the present value of each one, you would probably find they would be at the same place. Our strategy is to have at least some of our gas in the electrical sector.

Mrs. Sullivan: I was interested in reading through your annual report a little bit and to note in particular your new marketing efforts so that you will be moving away from dependence on system sales. Your comments today about new cogeneration projects are quite interesting. Could you provide a little more explanation by example of what happened with your client where the cogenerator paid up front for gas reserves?

Mr. Haberl: Certainly. Actually, we have not entered into such a deal. I am aware of another oil and gas company in Calgary called Canadian Hunter which has entered into such a deal. We have been approached by another cogeneration developer with a similar idea, but to this point we have not reached agreement on that proposal.

1150

Essentially, what happened was the cogenerator came to us and said he would like to prepay us

for a gas supply for 20 years. I am trying to recall the numbers. I believe it was something in the order of 80 billion cubic feet. He offered us a lump sum for that. What we did with it then was evaluate that proposal versus what we saw as the 20-year present value of our gas reserves. In our case, there was not sufficient premium offered by him to permit the deal to happen. That is essentially the way it works.

What he is buying is natural gas delivered to the wellhead. In addition to that, he would be paying operating costs for the gas processing at the wellhead. He would be paying the provincial royalties and transportation to the burner tip; so essentially he is purchasing discovered, developed natural gas.

Mrs. Sullivan: This one fell through, but assuming the price had been right, would you have been basing that price on your own estimates of long-term contract gas?

Mr. Haberl: Yes. They come to us with a number and we just weigh that against what we see the present value of future gas is. In round numbers–I am trying to recall the numbers now–it was about 60 to 65 cents per thousand cubic feet; that was the present value number that we saw for our gas. That is generally in line with our current finding and development costs.

Mrs. Sullivan: But there certainly is a prediction in the industry that with deregulation the price of gas is going to increase.

Mr. Haberl: It is going to increase?

Mrs. Sullivan: Yes, substantially over the next period of time, over the next 20 years. Is that not right?

Mr. Haberl: I sure wrestled with that one. I had a lot of fun with that one over time. At this point, I really do not know. Based on my own view of how much gas supply there is in western Canada, 150 trillion cubic feet or so, current finding and development costs range significantly from one producer to another, but at Sceptre's the gas finding and development cost is about 40 cents an MCF.

Based on my experience in gas marketing in the last three years, I tend to think the market is going to be setting the price. You can increase your prices for a period of time until the market says "Stop, we cannot afford to pay any more." We are putting the market out of business; if I cannot sell my gas to an end user at a price which allows him to continue his business, then I should not be selling natural gas. It has to fit whatever the market will be.

Mr. Richmond: You have probably sens that the underlying concern among committ members–since Ontario is not a major produc of gas, except for some pools in Lake Erie, b they are nothing to speak of–has been price a long-term security of supply. Ontario Hydro h also indicated to us it is not planning a large-scale, gas-fired thermal station.

Your company is based in Calgary. Do y have any sense in the western producing pro inces, Alberta and Saskatchewan, if they st rely in their public and private utilities in a maj way upon gas-fired generation or have they al backed out of that because of price and supp considerations? Do the Saskatchewan or Albe public or private utilities still rely upon burni gas to generate electricity in a big way or did th also get out of it?

Mr. Haberl: I do not think they have ev gotten into it.

Mr. Richmond: In Edmonton–I lived there the 1970s–they had in the river valley a gas-fir generator.

Mr. Haberl: Oh, did they? I was not aware that. I believe the majority, if not all, of Albert power is coal-fired. They do not use natural g locally. I think it is simply because the c deposits are right there. It is their best econom alternative at this point.

Mr. Richmond: Does your company supp any western utility with natural gas to burn in major generating station?

Mr. Haberl: No, we do not.

Mr. Richmond: Are you contemplating a contracts like that?

Mr. Haberl: I am not aware that they a looking to do any gas-fired.

Mr. Richmond: So you are telling us th even the western provinces' utilities, whi presumably would not face concerns over secu ty of supply, although the price might escal even for them, have not embarked upon this.

Mr. Haberl: At least in Alberta they ha abundant and, I believe, relatively clean a cheap coal in their backyard, so I think that preferred. It is better to burn that coal locally th to try to rail it out of there, I think.

Mr. Richmond: So you are not aware of t western provinces getting into this.

Mr. Haberl: I have not been approached any. I am not aware of that, no.

Mr. Passmore: You mentioned the possibili of signing 20-year contracts, obviously to avo cost increases and concerns about reliability

pply. At the same time, you mentioned that ere is a lot of gas going right by Ontario's door ading for the United States northeast. We had me suggestions from some witnesses who peared last week about gas markets tightening , so I am wondering what you think is a good indow to be looking at if you are an Ontario generator in terms of signing a 20-year ntract for gas supply. The suggestion was ade last week that the policy framework really eds to be put in place in Ontario immediately to able to sign those long-term contracts over the xt two to four years. Is that reasonable?

Mr. Haberl: I agree with that. It has been very teresting, the evolution of the natural gas arket in the last several years, particularly in e United States and then followed by Canada. everal years ago, the US was in an oversupply tuation. They reverted from long-term con-acts back to very short-term or spot contracts. fact, in many instances, people were trading as on a 30-day basis, 30-day contracts. It has ally been only in the last six months to a year at the US has come back to longer-term ontracts. They are back in Calgary seeking ng-term supplies, the large US interstates and as utilities, as well as power utilities down ere. Cogeneration has really taken off as a very iable alternative for a lot of people in the United tates, so they are reverting back to longer-term ontracts.

Mr. Passmore: If the policy framework that e witness immediately previous to you spoke bout is to be instituted, it needs to be done in the hort term.

Mr. Haberl: Very definitely, I think so. The ime to do it is now. Lining up a 20-year gas upply is not an easy thing to do. Although there s 150 trillion cubic feet remaining to be discovered, it has not been discovered yet. There s a cost of finding gas. Each million cubic feet loes get a little more expensive to find. We are unning out of needles in the haystack.

Mr. Passmore: You mentioned 500 million cubit feet per day going to the US northeast and, n sort of a throwaway remark, you said most of it s going to cogeneration. Can you describe the extent of the cogeneration market in the US northeast? Have you had any kind of an opportunity?

Mr. Haberl: I do not have any specific numbers. The way I look at it is that every industrial plant location in North America is a potential site for cogeneration, which probably runs into the hundreds of thousands of locations, but I do not suspect every one will turn to cogeneration. At Sceptre we are getting inundated with requests for cogeneration for a lot of facilities that are planned in upper New York state, in Massachusetts and in Vermont.

Last week I met with a large US interstate company in Pittsburgh that is looking at cogeneration in the state of Virginia. I found that one very interesting because they wanted gas from western Canada, which is several thousand miles away, rather than a gas supply from the US Gulf Coast, which is perhaps one third of the distance. That was very interesting. The reason for that is that they see the long-term viability of western gas. They do not see it as much in the Gulf Coast area.

1200

Mrs. Sullivan: Are you getting the same level of interest or any interest from Canadian cogenerators other than the one or two you have mentioned?

Mr. Haberl: In Ontario; I really have not discussed it with anybody in any of the other provinces. I guess the reason I have been approached by several people in Ontario is past marketing efforts and selling gas directly to large industry in Ontario. These people have approached me and they are looking at cogeneration at this point in time. It is on the planning horizon for them.

Mr. Passmore: I have just one last question. In the DSPS document that we were looking at, Ontario Hydro makes some fairly discouraging statements about gas, and you pointed out one of them here, the fact that you can deliver gas at $2.90 and you quoted a figure for Ontario Hydro at $5.08. To your knowledge, were you or any of the other people in the gas industry in Alberta, or even in the Ontario natural gas industry, consulted by Hydro when it was putting these numbers together as to what the actual cost of gas might be today and in the future?

Mr. Haberl: No, we were not. I was quite surprised by those numbers. If those numbers are right, I think Ontario Hydro should be investing in the oil and gas business.

Mr. Chairman: I have one question. I am just wondering about the capacity of the system. We have heard some bandying around that maybe you could get 3,000 megawatts or something of that scale out of gas generation or something over the province. If I look at our consumption and the figures you have given here, it seems to imply that maybe you would need another 500 million or something cubic feet a year to feed 300

megawatts of power, which I think is about a 10 per cent or 15 per cent increase in the present consumption of gas in Ontario.

If we look at the general growth of gas in the province anyway and go out 10 years, because that figure is what might be taking place 10 years from now, and consider what might be the growth in the use of gas across the province anyway–just in my own mind we might be looking at 20 per cent or 30 per cent more gas trying to come into the province–I am just wondering if the pipeline system is big enough to bring that in, if you can foresee any limit on the amount of gas that could be moved and, if there is a limit, what kind of cost might be looked at in producing the extra capacity.

Mr. Haberl: I think that limits will be put in place only by the ability to supply and the ability to consume the gas. Gas transportation can be built on a relatively short time frame to accommodate any future demand for natural gas.

As I mentioned earlier, we requested transportation of TransCanada at the end of August this year to have that gas flowing by November 1, 1990, so it is roughly a two- to 2.5-year time frame at this point for them to assemble all the requests, analyse their current system, see what expansion they need, go through the approval process with the National Energy Board and construct. It is roughly a two- to three-year time frame to put in more gas pipeline.

I do not see, really, any limits on the amount of hardware that you could put in the ground. It is simply a matter of looping existing lines. At this point out of Alberta, I believe there are four or five major or large-diameter pipelines, all owned by TransCanada and essentially in the same corridor. By the time it gets to the Toronto area, I believe it is down to two and maybe three pipelines.

In the gas transportation industry, it is simply a matter of looping or adding more pipelines to that, completing existing lines if they are not complete and building another line or another line after that in the same corridor. Then, over the length of the pipeline system, you would compress the natural gas to boost the pressure through the system. Again, it is just a matter of adding horsepower–more gas turbines to the system–to increase the operating pressures on the system.

Mr. Chairman: So you are saying the physical capacity of the system can be increased relatively easily?

Mr. Haberl: Yes.

Mr. Chairman: Would you think there enough gas? I have a picture in my mind of tl pricing you talked about with Northland Power Cochrane, Ontario. You set a pricing on tl margins of the gas market that the bulk of tl consumption must be in homes and so on.

Would there be sufficient people prepared do that kind of contract that might be indexed power or some sort of very long-term guarante rate to supply a major chunk of power in tl province? Or would we sort of run out of peop prepared to price that way because there wou be so much demand in other sectors that mig give them a price that could escalate more in tl market than what the market might charge?

Mr. Haberl: I think clearly, and Mr. Pas more was kind of alluding to it, that there is window. Timing is very important in this. W foresee a significant increase down the road f Canadian natural gas in the North Americ market. The sooner the cogenerators can get o to negotiate long-term contracts, the better o they are.

I guess, yes, there probably is a limite amount of gas available for this particular secto I think Sceptre is probably one of the fe producing companies that has really looked in cogeneration in a big way, so it is really a ne thing for western Canadian producers. There always the fear of the unknown.

It is an interesting negotiation in that g producers are being asked to assume risks c future power costs, of which we know very littl On the other hand, if the negotiation can go th other way, it is very difficult for the developer t assume the risks on future gas costs. I think m solution is somewhere in between. Throug negotiation, you can find a happy medium the and probably do a deal.

Mr. Chairman: You mentioned there migl be a limit. Do you have any sense? My figure w 500 million cubic feet. That is just a guesstimat but say 10 per cent more than is presentl consumed in the province. Would there be th much available?

Mr. Haberl: I guess there is really not physical limit. The limit would probably b determined by the demand for gas from, as yo mentioned, other sectors and other areas of Nort America. At some very near future date, we a going to get back into a competition to see wh can get hold of the next thousand cubic feet c gas. It is something I am looking forward to, n doubt.

Mr. Chairman: The type of contract that yo are writing, one where the producer is actuall

ning with the end user, is a relatively new enomenon, as you mentioned.

Mr. Haberl: Yes.

Mr. Chairman: Do you know how many bic feet of gas are contracted in that way at the esent time, how much of the market, maybe in rcentages? It must be pretty small, is it, right w?

Mr. Haberl: We refer to it as the direct sale arket. I cannot recall specific numbers for tario, but I would guess in the order of 20 or 25 r cent. Direct selling of natural gas is a very w thing. It has only been in place since early 86. Prior to that, it was all handled through the ajor utilities and the major pipelines. Sceptre's arketing department is only nine months old. e never had one before that, so this is very new r us.

Mr. Chairman: When you said 25 per cent, ould that be 25 per cent of all the gas that is under contract to come into Ontario or 25 per cent on the new contracts?

Mr. Haberl: No, 20 to 25 per cent of all gas going into Ontario, I think, is probably moving on a direct basis right now–direct to end users or groups of end users and from producers or groups of producers or marketing agents representing producers.

Mr. Chairman: So that sector has picked up pretty quickly?

Mr. Haberl: Yes, it has. It has really taken off in the last three years.

Mr. Chairman: Thank you. Are there any further questions from the committee? Seeing none, Mr. Haberl, I would like to thank you very much for coming and speaking to us today and for preparing this presentation and answering our questions. We appreciated very much having the opportunity to speak with you.

Mr. Haberl: Thank you very much.

The committee recessed at 12:12 p.m.

AFTERNOON SITTING

The committee resumed at 2:08 p.m. in room 228.

Mr. Chairman: Our first witness this afternoon is Bernie Jones from Blue Apple Consulting Inc. I wonder if he could come forward. Mr. Jones is going to be speaking to us about the report on natural gas and electricity supply option which was done for the Ministry of Energy and, I guess, released last August. You have some overlays. Perhaps I will turn the floor over to you and you could outline the report to us. If there is any time remaining, we will have questions from the committee.

Mrs. Grier: Why Blue Apple?

Mr. Jones: Why Blue Apple? A blue apple is the difference between yellow apples, green apples and red apples.

Mrs. Grier: I see.

Mr. Jones: I am a little bit different as a challenge. Does that help?

Mrs. Grier: Not radioactive or grown by a nuclear plant or anything?

Mr. Jones: It is like going into politics; it is chancy. No?

Mrs. Grier: Yes.

BLUE APPLE CONSULTING INC.

Mr. Jones: Okay. The presentation today is about natural gas as an electricity supply option for Ontario. I am pleased to have the opportunity to talk to you about this study. I hope it will be helpful to you. We were asked to talk about this topic in light of your interest in cogeneration and also to consider how the findings of our earlier study relate to the DSPS, which I know is the main focus of your interest.

This study was intended as a contribution to the ministry's evaluation of Ontario's electricity supply options. It is a complex issue. The study is not an in-depth review of the options; rather, it tends to establish a framework within which one can begin to bring together information from both sides and try to understand what the possibilities are for using natural gas in electricity supply. It may be helpful to understand something of the genesis of the study.

There are two factors that really led to its development. The first one is the 1986 report of this committee, which had recommended that Ontario Hydro develop a range of options for electricity supply based on the criteria of cost, flexibility and reliability. The report document that there was going to be increasing reliance nuclear power and less on fossil fuels and t natural gas use would be phasing down fr minimal levels to zero. At the same time, in l 1985, the western accord was signed between western oil and gas producing provinces and federal government. This accord led the way deregulation of oil and gas markets and, sub quently, for what we call market-driven pri and more open negotiations between buyers a sellers.

There was also the dramatically chang outlook for natural gas markets in the light of collapse of world oil prices and the demise of federal national energy program. Effective what we had at that time, and it looked as thou we would have it for several years in the futu was a buyers' market for natural gas. You m have heard about the so-called gas bubble, wh was simply a surplus of supply over demand.

In light of the fact that gas seemed to be mu more readily available, and was likely to priced lower than previously thought, and in li of the select committee's recommendations, proposed to the Ministry of Energy that there b study made of the possibility of using natural in electricity generation, particularly in light the changes in natural gas markets.

Very quickly, as you know–and I will dwell on this–there are a number of options electricity's planned demand: upgrading existi facilities, building new facilities, demand m agement, load management, power purchas investment in new tech and alternative techno gies and supply options using natural gas. W natural gas, clearly the technologies there simply a part of a possible solution to some of issues that the province faces.

With regard to the structure of the report, broke it into five areas. We looked at electric demand and supply and options to the year 20 we looked at the economic natural-gas-fi generation options, including the technologi we looked at the availability and cost of natu gas; we looked at barriers to the use of natural in generating electricity; and we considered strategic issues and the policy implications t could arise from that.

Again very quickly, to give you some ba ground here, it is helpful to consider the sour of information that went into the study. had effectively three sources–the Ministry

ıergy, Ontario Hydro and the natural gas dustry. We had discussions with the Ministry Energy staff. We had three studies available om the ministry–an Acres International study cogeneration, a Stone and Webster study on al technologies and a Liddle Engineering study uncontracted gas reserves.

The Acres study had concluded that technical- there was substantial scope for cogeneration in ntario, as much as 10,000 megawatts, but cause of various barriers, what you might call e implementable level was perhaps 1,300 egawatts. There was a very big difference tween the two, and government policy changes d other changes would be required to try to ise that level from 1,300 towards a more alistic figure.

The Stone and Webster study on coal technol- gies concluded that coal technologies would be ailable in the future and there was kind of light the end of the tunnel. At that time, we also took look at the information coming out of the nited States on coal technologies, which shows at coal technologies were very much at the search and development stage. From that erspective, I suppose the outlook for coal chnologies was less sanguine and certainly ore risky.

With regard to uncontracted gas reserves, the iddle study had concluded that there were very ıbstantial uncontracted reserves in Alberta and ıat they were very large in the context of ntario's demand for natural gas. I did not want dwell on those studies today, just simply cknowledge them.

We interviewed some staff in Ontario Hydro. Ve spoke with people in the fuels division– ystem planning and marketing. We also had the SOS available and the 1986 bulk electricity ystem plan that also looked out to the year 2005. inally, we spoke with people in the natural gas ıdustry, both upstream and downstream. We btained quite a bit of information and data vhich we were able to digest in producing the tudy.

What did we find? We found that if you step ack for a moment, one of the striking features of ılking to these three groups was what we call olitudes. We had a natural gas industry which eemed to be very preoccupied with coming to rips with deregulation. At the same time, it was oubtful that Ontario Hydro would take natural as options seriously.

I am sure you will hear from the natural gas ndustry. At that particular time, most of the ompanies involved were scrambling for markets and so on and trying to live day to day. That was more so upstream, I suppose, than downstream, but the regulatory framework was changing. People's time was occupied very much with living with the business realities of the day rather than trying to look at cogeneration and electricity generation.

We found within the ministry that again there were two solitudes. There was the group that did electricity planning and the group that looked after natural gas. They were experts in their fields, but there did not seem to be much overlap. I do not mean to be negative on that. I mean the reality was that it was only just then developing that natural gas could be an economic option.

There had been a very rapid change in the climate. Prior to that, there probably was very little need for these people to get together. The ministry had already acknowledged that need in actually contracting the studies I have spoken about previously, and also this study. We found that Ontario Hydro, which, in our opinion, was out of touch with the new realities of the natural gas markets, did not seem to be aware very much about the changes, at least in the context of what the gas industry was thinking those changes could mean to purchasers of natural gas.

We found, as well, a virtual lack of communi- cation between Ontario Hydro and the gas industry. In that context, we concluded it was time to take a hard look at the options and not to be bound by previous analyses or opinions. I might mention that it is no surprise that there was, if you like, poor communications between the two in light of the fact that they are major competitors in the marketplace.

With that background, we turned our attention to the technologies. First of all, we wanted to understand what the technologies were that were available. They fall into four categories: co- generation, new combined cycle power plants, repowering with natural gas and select use of natural gas. Each of these technologies has particular strengths and weaknesses and potential benefits to the province.

Cogeneration, as you probably know, is the simultaneous production of thermal energy and electricity. It is highly energy-efficient in com- parison to central plant generation. It can be cost-competitive, particularly if long-term sup- plies of natural gas can be secured at reasonable prices. It can reduce pollution and it would be primarily generated by private power producers.

Combined cycle is almost like a subset of cogeneration. A simple way of thinking about it is that you have one flow of gas that turns two

generators, rather than one in the normal configuration. It is energy-efficient. It has the benefit of short lead times. It is modular in the sense that you can build it in stages. Increments can be added as required so that you minimize the risks associated with long-term, high-cost construction projects. These plants could be owned and operated by Hydro or owned and operated by private industry. They would be available for new capacity.

1420

Repowering with natural gas: This is effectively the technology one would use for refurbishing existing coal-fired stations. Its energy-efficient technologies improve the management and operation of existing plants and it is based on proven technologies.

Select use of natural gas use: There are various components of select use or alternative mechanisms. Visualize natural gas being used in various combinations with coal as a fuel and also perhaps the gas being used in these various combinations and the combinations varying over the year, so that in a period when you were expecting normally high levels of pollution, you would use more natural gas to cut down on the pollution.

After looking at the technologies, we wanted to take a look at the economic options for using natural gas. A key obstacle in this case was the virtual lack of any site-specific data. The data were not available to us, and this was a shortcoming we wish we could have overcome, but we could not. We simply did not have the data.

In the absence of that data, what we did was break up the outlook into three stages: short-term options from 1987 to 1990, medium-term options from 1990 to 1995 and longer-term options from 1995 onwards. In those time frames, which admittedly are arbitrary, we felt we would be able to reflect some sense of the way in which gas technologies could be applied.

For the short term, there was the possibility of use of gas at the R. L. Hearn station, and there were a number of constraints on that which are pointed out in the report. Nevertheless, it was put in there to illustrate the economics. Cogeneration was a possible short-term option, the idea being to establish a base now for cogeneration while natural gas markets were particularly favourable to the development of that technology.

For medium-term options, 1990 to 1995, there was the possibility of using natural gas in combination with coal in such uses as ignition, when you first start up the coal furnace's warmup, true coal-firing, which is where you gas and coal on a continuing basis, and sel use. There was also the possibility of develop cogeneration to a higher level.

For the longer term, 1995 onwards, we that all options were open and that the strate bridging role was possible. What do we mean a strategic bridging role? If you look at th points on the screen, it is very clear from both DSOS and the DSPS that the electricity lo forecast range is very wide. It is also clear tha is possible there will be a substantial need new capacity. It is also evident that there will b need to refurbish much of the existing capacity is also evident there are uncertainties regard the availability of major supply options. I do think there is any doubt about this.

There is a possibility of delays in approvals new sites and transmission facilities. There is possibility of delays or failures of technologie mentioned earlier the clean-coal technolog and the fact that it is not certain at all when th will be available or what the cost of th technologies will be. There is the possibility delays in negotiating power purchases with ot jurisdictions and the possibility of tighten emission limits. Altogether, they add up to a ve considerable level of uncertainty in planni electricity supply, which makes Hydro's j quite difficult.

When we had gone through the economics a technologies and looked at a possible role natural gas, we had to think about what were t obstacles to the use of gas in the system. V found a number of obstacles. We were asked the ministry to look for these, incidentally. T first one we came across was Hydro's percepti of its corporate economic responsibilities. H dro, as I think it says in the DSPS, believes it not just a public utility, but that it has broad economic responsibilities in terms of econom development in Ontario and that the governme essentially has placed this responsibility wi Ontario Hydro.

Second, Hydro has taken a view that natur gas is a premium fuel and its best use is not electricity generation. Furthermore, it kno that natural gas is not an indigenous Ontar resource and has shown a strong preference f renewable resources and resources indigenous the province. On that basis, that was a pret significant barrier within Hydro's corpora boundaries, if you like, to the adoption of natur gas as a strategic option.

The Acres study, incidentally, concluded th a major barrier to the development of cogener

on was what it called the central position of Ontario Hydro. We also noted lack of information and communication between the gas industry and Hydro, which I mentioned earlier. There was insufficient appreciation, as well, for the facts on the availability of gas and options for purchase.

There are at least four good options for purchase of natural gas that we identified. One of them is to buy system gas. That is the normal way you buy gas in Ontario. You buy it from one of the local distributors, and it would have arranged long-term contracts with suppliers in western Canada. That is called system gas. You buy through the traditional mechanisms.

You can also make direct purchases with producers upstream. That certainly is an option open to major purchasers or even to smaller purchasers who get together and enter co-operatives.

You can buy gas in the ground, which is uncontracted reserves. That has been done. I imagine the gas industry could give you some examples of that.

Finally, you can engage in an exploration and development program on a joint venture basis. We took the view that you can manage your gas supply by taking a portfolio approach, where you can mix your short, medium and long terms. You can mix the supply options that are available, and that way you can reduce the risk of failure of supply and you can also hedge prices.

As the final obstacle, there was some confusion about Hydro's ranking in costing of the options. I do not want to dwell on this, but in the DSOS study they use a methodology which we found was unintelligible to people outside the system planning division at Ontario Hydro, and that includes people within Ontario Hydro. They would tell me they did not understand it. I think there was one person in the ministry who felt he understood it.

Mrs. Grier: Was it the minister?

Mr. Jones: I did not say the minister; a person.

So what could we conclude? After looking at all of the information, it was clear that new electricity demand/supply options would be required over the longer term. It was pretty obvious that coal-fired generation would be increasing, that acid gas emissions were going to rise and that new clean-coal technologies would be required.

It was also evident that any delays in technological development or in obtaining approvals for new capacity could constitute a threat to Ontario's electricity security–we felt that the risk would be substantial on that front–and that changes in natural gas markets have improved the competitive position of gas.

Just to carry on with the conclusions for a moment, we felt that natural gas could play a strategic bridging role. The DSPS and the DSOS are very clear on the fact that there are risks, and I have tried to indicate that natural gas technologies could play a strategic role in this period ahead.

We concluded there were short-, medium- and longer-term natural gas fuel generation options which were open, and for some of these options, favourable gas markets were pretty critical. In other words, we put that in because we felt there was the possibility that US utilities, for example, would move into the Canadian market and start to take advantage of the favourable gas market conditions. In fact, they have started to do that. Rather than wait four or five years down the road to try to buy into the market, it is cheaper to do it now if you feel that natural gas has this role to play and should be part of the overall mix.

1430

We concluded, as I have mentioned to you, that barriers exist which need to be addressed, and we suggested there was a need for clarification of government policy.

We were asked by the secretary of the committee to relate our findings on the DSPS, as it came out subsequent to our report. It is clear from the DSPS that these load forecast uncertainties remain; that the availability of supply options is just as uncertain as ever; if anything, there has been a tightening and Hydro is beginning to feel a greater sense of urgency than perhaps it did two years ago; that there are serious emission control problems which have to be grappled with; that the critical time frame is 1994 to 2000; that natural gas is still virtually ignored as a strategic option; it was not addressed that way in the DSOS and is not addressed that way in the DSPS; that the perceptions which Hydro has regarding the availability, affordability and suitability of natural gas are basically unchanged and, as a result, Hydro sees only a minor role for cogeneration and for private power.

There are some things the DSPS has to say about natural gas which are interesting. The DSPS notes that natural gas options are favoured by the public when you do not consider the costs of any of the options but simply look at the options without regard to cost. It says the public looks at natural gas and prefers it to nuclear and to coal.

It notes also that there is widespread public support for the concept of cogeneration, that the public believes that is a useful thing to do.

The DSPS still questions, in very strong terms, the availability of natural gas and its productive capability. The DSPS also believes that natural gas is a natural resource whose availability is limited by lead times. It seems to classify natural gas in that context in the same way as it does nuclear and coal, yet the truth of the matter is that gas can be available in a number of applications within a two-year lead time. Nuclear and coal cannot possibly even begin to approach those short time frames.

The DSPS, with the DSOS, expects natural gas prices to rise substantially. Hydro's price expectations appear to be somewhat out of line with what others are expecting. The DSPS consequently concludes that natural gas may have a role to play in meeting short-duration peaks in demand. This is an expensive role for natural gas to play, to have a large demand for gas on a short-term basis. It is quite expensive to deliver that kind of gas. As well, natural gas is classified as a scarce, non-Ontario fuel, if you wish, which ranks low on Hydro's resource preference scale.

There is very little in the DSPS that would give recognition to any strategic role for natural gas.

Very quickly, there are two further developments which I thought I should note. One is the report of the technical advisory panel. As you will know, it sees promise in independent generation and feels Hydro's proposals should be subject to public review and regulatory approval. It sees more emphasis being placed on probability planning and risk mitigation. It wants more attention to options with short lead times and sizing flexibility and it wants a fair basis for comparing options and for independent review of nuclear costs. It also calls for independent, technically oriented, public review of Hydro's strategic planning.

The drift of those recommendations in the context of the use of natural gas in electricity generation tends to support our earlier conclusions; the technical advisory panel would see a broader role for natural-gas-fired generation.

I hope this has not been too long. In the final slide, I identified two matters I thought you would be particularly interested in. One has to do with the question of whether the DSPS has underestimated the potential strategic contribution of natural gas technologies and independent generation. That is one issue. Can natural gas, through diversifying fuel and technologies, in fact improve the security of electricity supply even if only in the strategic context of the next two decades when there will be all of these uncertainties about technologies and about the availability of supply options?

As you will have read with the DSPS, there are some very critical time points coming up: the possibility, under the high load forecast, of needing new capacity in the early 1990s, and it goes on from there. There is a need for decisions.

Energy efficiency: Can natural gas make the electricity supply system more energy efficient? Can natural gas have a beneficial impact on the environment? I think it is clear from the data we have put in our report that natural gas, relative to coal, is clean. It has a good impact on the environment and therefore it really is an alternative to scrubbers and to some other technologies.

The second matter I thought might be close to your hearts is: Who should determine private power policy and what is the appropriate mechanism for its implementation? Do we need a new regulatory agency or should that role perhaps be given to the Ontario Energy Board? Do we need an agency to advise the government and implement buyback rates, targets for cogeneration year by year, to set standards and so on?

It is our view that there is a need to take the policy with respect to private power away from Hydro and make that the responsibility of government and have Hydro participate–clearly Hydro has a major interest–in a process which also has the various potential suppliers involved.

Obviously, I have not tried to work out all the details of a policy or a mechanism, but I think, based on all the stuff I mentioned earlier, including the perceptions, that if Hydro continues to control the process it may not go very far.

Mr. Chairman: Thank you, Mr. Jones. I wonder if it is possible to get you to table those slides with us or perhaps we could make copies. Perhaps the clerk can do that so we can make them part of the official record. We have about half an hour now for questions.

Mrs. Grier: I found that most interesting. What I would like to ask, though, is: If, as you acknowledge, the scene with respect to natural gas has changed very dramatically over the last two or three years, what is to say it will not change back again?

Mr. Jones: Two things happened. One was the change in government policy, the move away from regulation of the natural gas markets into a deregulated environment. I suppose it is always possible that that policy could change. However, there has been a drift, it seems to me, in policy

ıerally, towards opening up markets and vards deregulation. If, under free trade–there going to be an election this year, we know t–you have a broadening again, an opening up the markets, it seems doubtful that you would ve a reversal in government policy.

One possibility would be that if you had, in the ure, a period of shortage of supply involving ;, then you could have government adopting a ferent set of policies. We took a look at the ural gas reserves in a continental context and it s our conclusion, particularly in view of some v numbers which have come out of the US ently through the Department of Energy, that gas supply availability looks pretty good for ite a period into the future. There are questions out price–there is no doubt about that–but the ailability looks as if it is there. I doubt there uld be a change in government policy.

In terms of the markets themselves, one estion would be whether, after the big collapse the early 1980s, the Organization of Petroleum porting Countries cartel will get resurrected d start to hold the world to ransom again. At s stage, I do not see that as a possibility.

The final point I would make is that if potential ers, whether Ontario Hydro or private power oducers, go into the marketplace now and get eir supplies of gas on long-term contracts, then ey have less to worry about.

40

Mrs. Grier: A long-term contract is what, 15 25?

Mr. Jones: We are looking at 20 or more ars. That is what US utilities are able to get ınadian gas for right now.

Mrs. Grier: You paint a fairly gloomy picture out emissions and what is going to happen over e next 10 years. I assume that is based on your sessment that scrubbers and retrofitting of isting coal plants will not occur.

Mr. Jones: No, not really. It is based on, I ink, Hydro's own view. If the economy ntinues to be strong and if the demand for ectricity continues to grow–and we know it ill not grow as fast as in previous times, relative the increase in output of the economy–as I iderstand it, and I read the DSPS like every-)dy else, Hydro runs very quickly into con-raints, depending on whether it runs with the gh load forecast or the most probable load recast. They cannot meet the emission limits. nder the high load forecast, you look to about)00 or 2002. Even with scrubbers on all of the kisting plants, they still cannot meet those limits. Obviously, they are more competent to give you that information than I.

Mrs. LeBourdais: Since Ontario Hydro, at least from your perspective, sees its economic mandate and its corporate mandate on a very broad scale, and also since the public perceives Ontario Hydro as being sort of synonymous with everything having to do with energy in the province, how do you see that being changed? Would a name change that took the word "hydro" out of the corporate name be a possibility to break that down, without naming a specific substitute but something that is more generic?

Mr. Jones: I think you are right about the public perception. I happen to have a strong perception that Ontario Hydro has been doing a good job in the sense that electricity supply is available when you need it. That is very important.

I am not too sure about a name change, as such. It might. It would depend very much on the name. You could have a name that would indicate, in fact, that it would be more of a development agency than it is already. I think if you were going to do something to change the character and the climate and the responsibilities, a name change would be part of that. I do not know if that helps, but sure.

Mrs. LeBourdais: Would you see any other ways, over and above that, which would allow them and their employees, as well as the public, to begin to see something other than hydro?

Mr. Jones: I believe it would have to be a message from the government. It is really the government, I suppose, that defines perhaps a little bit more clearly in the Power Corporation Act what the responsibilities are. Its primary responsibility is to deliver secure power at the lowest long-term cost. I think that is probably, in a nutshell, the kind of approach you need.

If you get beyond that and Hydro has to worry about whether it is creating enough jobs in the economy and whether it has an investment program going during an economic recession, then I think it starts to cloud and confuse the corporate objectives of Hydro. I do not blame them. I think at times in the past the government has kind of leaned over to Hydro and prodded it a little and said, "Would you mind getting that project going because the economy is weak?" You cannot blame them completely, but it does not mean that past performance is the way it should be now.

Mrs. Sullivan: This morning we had an interesting presentation from Sceptre Resources.

One of the things that a representative from that company talked to us about was new marketing initiatives that natural gas companies themselves are taking, including the cogenerator entering into long-term contracts for the reserves, and natural gas companies themselves being involved in joint ventures for exploration or being involved in equity participation and cogeneration.

I note that in your report you talk about the US gas distribution companies themselves offering special rates for cogenerators because of a steady load characteristic. I am wondering if much of the use of natural gas for cogeneration is going to sort itself out naturally in the private sector through these longer-term contracts that are evolving as a result of deregulation.

Mr. Jones: The marketplace will play a major role, clearly. Buyers and sellers do have to get together to negotiate contracts. It is not until you actually get the buyers and sellers together that you can find out what the realities of those contracts are.

I guess there is a question that Hydro, as it presently does, determines the policy for cogeneration and sets the buyback rate. It sets the standards and deals differently with small producers than it will with larger producers. It wants to sit down with each individual cogenerator and discuss the benefits and costs of a particular proposal in terms of the system as Hydro sees it, which are legitimate interests by the way.

I think you are a long way from being able to link the two things: the discussions about the way you bring the producer and Hydro together and the realities of the natural gas markets. What I think you need–I am not putting this very well–is clarity about who is responsible for what in putting the deal together. Do you know what I mean? It is easier then for the upstream portion to be worked out.

What is the good in trying to work out a 10-year, 15-year or 20-year gas supply if you are not sure, first of all, that the project is even going to be heard by Ontario Hydro or that ultimately the standards that are going to be set are going to be unacceptable, which is a possibility. I am not suggesting that is the way it is going to be. I am saying that is a possibility.

So I think it is very important somehow that a mechanism be found–and it may be a new regulatory agency–whereby the policy is clarified so people understand what the rules of the game are and that there is a mechanism where potential power producers talk with Ontario Hydro.

If they work out a deal, that is fine. If they cannot work out a deal and producers feel that they have a good case, they should be able to go to a third party and say: "Hey, look. We think we have a really good economic project here for the province. For some reason it is not being looked at as well as it should be looked at."

Maybe I have not really answered your question. That is a toughie.

Mrs. Sullivan: I am going to read over what you have said. I want to refer to one other thing relating to short-term options in the report on page 46 where you talk about economic replacement of coal at Hearn if gas were to be priced below $2.40. It is about $2.70 now, is it not?

Mr. Jones: Yes.

Mrs. Sullivan: So basically what you are saying is that it is not economic. It may have been economic at the time the report was written.

Mr. Jones: I think what we were trying to do here was show that we were getting close to being economic. A lot would depend, for example, on whether you put value on the fact that you could reduce emissions at that station, given the other alternatives. The reality was that Hydro did not need that kind of output at that time. Because of the way the system operates it is possible they might have needed that. So we felt that was a possibility.

Bear in mind that we also had numbers that said that if you had an exploration development program under way–we were being told by western interests that you could bring gas on supply for $2. One option gave you $2 gas. System gas would give you $3 or something like that. In between you had a range of costs for gas, some of which might have made economic sense here.

We did not honestly believe, I guess, that Hearn would be turned on within the next year or two. From what I heard, the station was physically in bad shape. Those are the kinds of price ranges. It is partly a political thing. If you felt there was value in reducing emissions for the sake of reducing emissions, then a US estimate has shown that 50 cents per million BTUs is about the cost of that. So you could take 50 cents off the top. Then it becomes competitive.

Mrs. Sullivan: Or add it on to the cost and assume that is the social cost.

1450

Mr. Jones: Well, no. What I am saying is let's say the cost of gas in the marketplace is $2.70 and by using gas, as compared with a coal alternative somewhere else in the system, you

re able to reduce emissions and you saw value loing that for the sake of doing it. The cost of ucing those emissions at the other location uld be 50 cents per million BTUs, so you take t off. So it would be like the equivalent of 20 gas.

Mrs. Sullivan: I understand. Thank you.

Mr. Charlton: I think my question has been swered.

Mr. Richmond: I wonder from your knowlge of the North American gas markets and the inging environment due to deregulation and ces and the like, are you aware of any major olic utilities in consuming states or provinces t have followed some of the models you have lined and have increased their reliance upon s and taken advantage of these opportunities?

Mr. Jones: First of all, you will find people a more expert than I on the natural gas markets, there are a couple of examples in the report. e is the Ocean State Power project, which I derstand at some point you will hear about. at is a cogeneration project which is in Rhode and and it uses Canadian gas and it is a)-megawatt plant, I believe, and there is a cond stage which will go ahead at some point. at is an illustration where an American utility s used Canadian gas to put a cogeneration ility in place. Now they bought a long-term s contract and it has a base price and an calator, based on a basket of fuels. I do not ve all of the details. There are some in this ort.

In another situation, a more recent one, a generation facility in New York has purchased nadian reserves in the ground. They made an front cash payment–I think it was about $70 llion–and they bought the gas in the ground d they arranged to ship it and pay the price. So ey controlled the upfront gas costs and they are bject then to the risk associated with increasing nsmission costs or government royalties and at kind of thing.

But that is also like a 20-year contract and, to e best of my knowledge, certainly in the view the gas industry in the United States and the est report of the Department of Energy in the S, natural gas will be playing a much larger ategic role in electricity generation in the ited States in the future. They feel confident at the resource is there and they will use it. Is at helpful?

Mr. Passmore: Mr. Jones, in one of your renthetical remarks you mentioned that the gas dustry and Hydro are major competitors in the marketplace. In your view, is that what we are really talking about here in terms of why Hydro perhaps downplays the role of gas? Are we talking about market share, and a possible gain of market share for gas and the gas utilities perhaps is a loss of market share for Ontario Hydro? On the cogeneration side?

Mr. Jones: I think it has to be a factor, and it may be the most important factor, but there are other considerations too. I mentioned Hydro sees itself as a public utility with these broader responsibilities now. Who is to blame for that I do not know, but that is the reality.

There is also the point that I think some electricity planners in Hydro believe that they have a responsibility to ensure that energy resources if writ large are used most appropriately. What I mean by that, and I can show you a statement, is they say electricity planners should look at the overall supply and demand for energy and use those energy sources which are in our best overall economic interest.

That, of course, goes way beyond the mandate of producing electricity at the lowest cost. It then gets into economic policy, which is, "We won't use gas because it should be used somewhere else in the economy." It is as simple as that. So I think that is also a factor. I would not know how to weigh them up. I think they are all important.

Mr. Passmore: We had a witness come forward this morning and do some sensitivity testing for us and it was suggested that a figure of six cents a kilowatt-hour might represent the value of power at the margin in Ontario and there would be a considerable amount of cogeneration result from that. Would you have any comment to make on that?

Mr. Jones: I do not know if it was in the evidence that Hydro gave before this committee recently, but I think Hydro itself acknowledges that at six cents a kilowatt-hour it believes it would have a large volume of offerings from cogenerators.

If I were asked to pick a number, I do not think there is going to be one number in the end that will work. You are looking probably at a range of anywhere from four to maybe six. That would be my guess, but you know more about this, I guess, Mr. Passmore, than I do. It depends on the methodology that you approach. If you want to use the proxy plant method, then look at the cost of Darlington, for example. You get a different result than if you look at the existing system in total. I think that at six cents you would see a lot of power.

Mr. Runciman: Mr. Jones, you have been talking about combined-cycle plant. You mentioned the short lead times. I think you made reference to two years.

Mr. Jones: Yes.

Mr. Runciman: I am sure we are comparing apples with apples. When we are talking about two years, is this all of the approvals, etc., and up and running in two years? Is that what you are suggesting?

Mr. Jones: Let me step back a moment. If you were looking at gas supply, for one thing, TransCanada PipeLines tells me that from the point when it signs a contract with you, if you own a gas supply and are willing to sign the contract, right, and so you sign a contract, it can deliver gas to your facility in two years or less. In other words, they can put in the expansion. What they have to do is put in extra loops, as they call them, like parallel lines of pipe at various stages, and add compressors into the system. They can do that. The technology is proven.

Again, if you sign a contract to build a combined-cycle facility, you have to have a site in mind; you have to have the equipment and put facilities in place. It partly depends on the size of the operation. I am not sure to what extent the approvals–I know that on the gas supply front the approvals do not need to be a problem. The approvals are part of the normal process and are usually obtained within about a year, the approvals to actually put the facility in place.

I am not sure what the zoning regulations would be, depending on where the site was picked, for a combined-cycle plant. If somebody wants the plant and think it is good, I imagine the zoning could be done rather quickly.

Mr. Runciman: You have not been through this exercise in any–

Mr. Jones: Not in detail, no. This is based largely on what people's perceptions are of what can be done.

Mr. Chairman: Mr. Jones, we would like to thank you for coming today, presenting your report to us and discussing these issues. I think you have helped us put it into perspective. Thank you again. Goodbye.

I wonder if I could ask the next witness, Mr. Geller, to come forward. Mr. Geller is the associate director of the American Council for an Energy-Efficient Economy. In fact, with this witness we are shifting back to a subject we spoke of a couple of days ago, and that has to do with things such as efficiency standards and conservation of energy. Mr. Geller has brought a paper, which the clerk has just handed o Perhaps with that introduction, Mr. Geller, I w turn the meeting over to you.

AMERICAN COUNCIL FOR AN
ENERGY-EFFICIENT ECONOMY

Mr. Geller: I work with a nonprofit organiz tion based in Washington, DC. We researc analyse and promote energy-conserving techn ogies and policies. Besides my written sta ment, I had one paper I wanted to submit to t committee, for the record, that addresses some the specific questions I was asked in the letter invitation.

I would like to discuss US experience w utility demand management and particula energy conservation incentive programs. I w also briefly comment on equipment efficien standards in the US and the potential to u electricity conservation to combat acid rain.

Utility demand management is widespre and growing in the United States. A survey 123 utilities completed in 1987 found that 85 p cent have implemented demand-side manag ment programs. Some of these programs a more than 10 years old and have already cut pe demand by hundreds and, in some cas thousands of megawatts.

1500

The survey found that the 76 utilities reporti on their funding levels spent about $580 milli on conservation and about $135 million on lo management in 1985. A few utilities, such Pacific Gas and Electric Co. and the Bonnevi Power Administration, have at times spent excess of $100 million per year on conservati programs alone.

Rebate programs are probably the m common type of efficiency incentive progr utilities have conducted in the US. Reba involve the utility paying the customer–reside tial, commercial or industrial customers–for t purchase and installation of energy-effici equipment: appliances, heating equipment, a conditioners, lighting products, motors. If t customers purchase energy-efficient equipme they get a payment. The money goes the ot way, from the utility to the customer. That, course, helps the utilities keep load growth und control and helps avoid the need for constructi new capacity as rapidly as they would ha otherwise.

I was involved in a survey of these reb programs which was finished about a year an half ago. We found that 59 utilities across t country were offering these rebates to purchas

energy-efficient equipment. The programs ere more common in the south and on the west ast and in the northeast where reserve margins e lower as compared to the central part of the untry.

The primary reason given for these rebate ograms was to reduce peak demand. Conse- ently, efficient air-conditioners and heat mps are the most common products for which centives are offered; but in quite a few ograms incentives were being given to cus- mers who purchased efficient refrigerators, eezers, water heaters, lighting products, motors d heating, ventilating, air-conditioning equip- ent in commercial buildings.

The qualification levels and rebate amounts ry from program to program. In some cases, xed rebates are given; in other cases, the rebate ries with the level of efficiency of the product. terms of program scale, the programs vary om pilot programs with funding of less than 100,000 per year up to full-scale savings quisition programs. We found five residential- ctor and two commercial-sector programs with dgets of over $5 million per year.

The table at the back of my handout summar- es the characteristics of six of the most effective d largest rebate incentive programs. For the six ilities listed in the table–some of those utilities, acific Gas and Electric, Texas Utilities, Florida ower and Light, are large utilities with over 0,000 megawatts of peak demand; not as large Ontario Hydro but in the same ballpark.

The average reduction in peak demand for the x utilities is about 60 megawatts per year. hese utilities are cutting their peak demand by ughly 0.4 per cent to 1.4 per cent per year with average reduction of about 0.7 per cent per ear through these rebate programs alone.

In terms of cost-effectiveness, the utilities are pically paying about $200 to $300 per kilowatt f avoided peak demand, which is roughly one nth to one half the cost for new generating apacity in the US, depending on whether it is ase load or peaking capacity; still, it is much ore cost-effective to reduce peak demand in is manner than it is to add new capacity.

The majority of the utilities state that they are atisfied with their rebate incentive programs and ery few of these programs are being stopped. Most are being expanded.

To sum up: As I think we would all expect, oney can be a fairly effective motivating chnique and it seems to be an important part of ese overall utility conservation efforts in the JS.

Regarding loan programs, some utilities are providing low-interest or no-interest loans to encourage the purchase of energy-efficient equipment. The objective is, of course, to reduce the first-cost barrier to investing in conservation and sometimes to offer a loan repayment plan whereby energy bill savings exceed monthly loan payments. Offering low-interest loans can improve both the degree of participation and the resulting energy savings in conservation programs. Comparison of utility programs throughout the country shows that combined audit-loan programs have participation rates which are much higher than audit-only programs.

But experience has shown that loan programs can result in high administrative costs and debt-service expenses for utilities. Also, when customers are given a choice of a rebate or a low-interest loan, they tend to prefer the rebate. Southern California Edison Co., for example, found that only two per cent of participants in their residential conservation incentive program preferred a loan over a rebate. Puget Sound Power and Light, a utility in the Seattle area, had similar results when it offered commercial customers either a cash grant or a zero-interest loan. For these reasons, some utilities have phased out their loan programs.

My understanding is that the Power Corporation Act here in Ontario prevents Ontario Hydro from offering rebates; it can go ahead with loans for the installation of conservation products but it would have problems with rebates. Given the experience in the US, going the loan route perhaps appears not to be the optimal approach to providing an incentive for conservation. I would encourage the committee and Ontario Hydro to try to work out a way to go the rebate route if it is going to go forward with a large conservation effort.

The availability of a financial incentive is just one of the many factors influencing whether consumers invest in energy efficiency. My handout goes into some of the other critical nonfinancial aspects of utility incentive programs, which I will skip over in my oral remarks.

Direct installation is another type of utility conservation program under way in the US. It involves a utility or an energy service company hired by a utility directly installing conservation measures in eligible homes, commercial buildings or industrial facilities. There is typically no cost or minimal cost for the building owner or the industry. Consequently, a high level of participation and conservation adoption can be obtained. These direct installation programs are often

adopted in hard-to-reach markets which do not respond well to information or incentive programs, such as low-income or rental housing or commercial-industrial facilities with quick payback requirements.

Pacific Gas and Electric, for example, greatly increased the participation of low-income households when it switched from a zero-interest loan offer to free installation; this is a residential conservation measure. In addition, the cost per household turned out to be about the same for the utility through direct installation as compared to the zero-interest loan offer because of the high debt-service outreach and overhead cost with the loan program.

In another example, a utility in New Jersey and Pennsylvania contracted with private companies to install conservation retrofits in electrically heated households at no cost to the consumer. The utility is paying the contractor based on actual electricity savings. This program was tested in four communities in 1983 through 1985. Conservation measures were installed in about 36 per cent of eligible households, which is a much greater participation rate than is customary in utility financial incentive programs. I have gone through a couple of other examples in my handout.

1510

In general, I recommend that direct installation be given consideration in Ontario in order to meet the ambitious electricity savings targets set out by Ontario Hydro in its conservation plan.

Another type of utility conservation program that we are starting to see adopted in the United States is something called demand-side bidding. Demand-side bidding involves a utility requesting the owners of buildings or industries, or even third parties, to propose particular electricity conservation projects. Rather than specifying the level of incentive payment, the utility allows the project sponsor to propose payment rates in a competitive process. Proposals are evaluated by the utility on the basis of cost, technical soundness, reliability and other factors. The utility then enters into contracts with winning bidders. Efficiency measures are installed and the sponsor is paid according to the contract rate for estimated or verified savings.

Utilities in both Maine and Massachusetts have solicited bids for electricity savings. In one program, Central Maine Power Co. offers to pay up to 50 per cent of the initial cost for conservation projects in commercial or industrial facilities in order to lower the payback period to two years, with actual payments dependent on measured savings. Under this scheme, the utili has been paying roughly one to two cents p kilowatt-hour saved through the projects it h contracted for.

In some areas, demand-side bidding is bei adopted along with bidding for new sources electricity supply. This involves utilities reque ing proposals for electricity supply from inc pendent power producers or cogenerators alo with bids for conservation projects. Proposals a reviewed and contracts signed, enabling a util to acquire cost-effective sources of new capac at minimal financial risk.

Central Maine Power Co. began allowi electricity conservation projects and new supp projects to compete directly late in 1987. T first round of bids resulted in 13 of the top proposals being conservation projects. Thir five megawatts of electricity savings we proposed, at an average requested price of 3 cents per kilowatt-hour of savings. Other sta and utilities–for example, in New York a Vermont–are starting to follow the example in Maine.

Demand-side bidding offers the potential utilities to acquire large amounts of electric savings as the need arises in a very cost-effect manner. However, experience with conservati bidding is still rather limited, and questions su as how to determine electricity savings, how deal with reliability problems, how to minim transaction costs and how to maximize progr impacts still need to be worked out.

Demand-side bidding is a promising strate that I think should be tried out as Ontario mo towards these cost-energy services and aggr sive conservation efforts on the part of Onta Hydro.

Let me turn to the area of minimum efficie standards. I was also asked to address that to Several states, such as California, New Yo Massachusetts and Florida, have enacted mi mum efficiency standards for residential ap ances sold within their borders. In 1987, natio appliance efficiency standards were adopted the US. This past summer, fluorescent light ballasts were added to the federal standards, minimum efficiency standards for incandesc and fluorescent lamps are also under devel ment.

By affecting all products produced or so minimum efficiency standards can be an portant means of promoting greater end- efficiency. Appliance standards are conside the most effective conservation program California, resulting in a cumulative reductio

ak demand of about 1,750 megawatts, as of ;t year. The national appliance standards force anufacturers to upgrade their entire product e to the top of the efficiency spectrum within a v years. The national standards will take effect r most products in 1990.

Expected peak demand savings are 21,000 egawatts by 2000, worth about $28 billion of t economic savings for consumers. The fluo-scent ballast standards, recently adopted, add additional 7,100 megawatts of peak demand vings and $11 billion of savings for consumers.

The national standards must be periodically viewed and upgraded by the department of ergy, if justified. This is likely to prompt rther efficiency improvements in energy sav-gs.

As you probably know, US efficiency stan-rds do not apply to exports. Less efficient oducts can still be manufactured in the US. ey are not eligible to be sold in the US, but y can be exported. It is probable that the indards will affect products exported to Canada d other countries because US manufacturers not likely to operate separate production lines what is a relatively small market for them. Of urse, Canada can ensure that it will obtain ergy savings and produce competitive appli-ces by adopting its own efficiency standards. I derstand that legislation has been passed here Ontario permitting the establishment of ovincial appliance efficiency standards. I hope it, as in the US, tough standards will be opted.

Minimum efficiency standards can comple-ent and support utility demand-side manage-ent efforts. The standards have an effect on all oducts at no cost to the utility. This reduces the certainty regarding future levels of equipment ficiency, helping utility planners to better edict future electricity demand. There are no oblems with so-called free riders or nonpartici-nts, which is the case with other types of utility nservation programs. The standards eliminate efficient products from the marketplace, while centive programs can promote models of ceptional efficiency.

Utility incentives may not be necessary or asible if standards greatly narrow the range of ficiencies available in the marketplace. It is cessary to wait and see what happens with the indards before deciding whether it makes sense continue with the incentive programs that have en under way. We have seen, for example, in alifornia that both minimum efficiency stan-rds and utility incentive programs have been used to stimulate the highest levels of equipment efficiency.

I think I have a few more minutes. I would like, if it is all right, to comment on some studies that we have been conducting on the role that electricity conservation can play in reducing acid rain emissions and reducing the cost of acid rain control, which I know is a very timely topic here.

My organization was involved in two studies in the last couple of years, one for the so-called ECAR power pool, which is the power pool in the United States which includes Ohio, Michigan, Kentucky, West Virginia and Indiana. We also worked recently with the office of the consumers' council, the consumer advocate in Ohio.

Looking at what contribution aggressive electricity conservation efforts could play in cutting acid rain emissions and reducing the cost of acid rain control, we developed a number of different scenarios of load growth and pollution control, both base-case scenarios of load growth and accelerated conservation.

1520

We also looked at different scenarios for pollution control–the base case of no additional emissions control and then assuming that utilities were required to cut emissions by roughly 50 per cent over a 10-year to 15-year time frame. Doing this analysis of conservation potential and then simulation of utility performance and utility costs, we found accelerated conservation, whereby electricity demand was cut by something like one per cent per year from the current forecast in this region. The current forecasts are roughly about two per cent per year of load growth. We looked at scenarios where load growth was reduced by about one per cent per year through the accelerated adoption of available cost-effective conservation measures.

We saw acid rain emissions being cut by roughly 10 per cent by the year 2000, not a very large reduction, but a significant contribution to a sizeable cleanup of acid rain emissions. More important, the economic savings from keeping load growth down, the savings from avoiding operation of the more expensive power plants in the near term and avoiding the construction of more costly power plants during the 1990s could more than offset the cost of aggressive pollution control, say, a 50 per cent cut in acid rain emissions within about 10 years, which is roughly the level being discussed in the various legislative proposals that have been introduced in the Congress in the United States. Utilities and their ratepayers would actually come out ahead

by pursuing electricity conservation together with acid rain control, as compared to a scenario where neither occurs.

The studies we did also looked at the different kinds of legislative approaches to acid rain control. We tried to determine which approaches were most amenable to this kind of a strategy. Different approaches, in some ways, encourage conservation. In other ways, they penalize conservation efforts. We have been advising the Congress on legislative approaches which will most encourage conservation. It turns out that flexible approaches, including overall emission ceilings rather than emissions rate limits, will provide the utilities and their regulators with the most incentive to go ahead with conservation along with acid rain cleanup.

I am also involved now in the study under way here with Marbek Resource Consultants on the role that conservation could play in helping to control acid rain and keep down the cleanup costs in the province, which is a study for the Ministry of the Environment. I would be happy to go into more details of these assessments.

Mr. Chairman: Perhaps we could have some questions from the committee. Are there any questions?

Mr. Runciman: I have a quick one. You were talking about your success in a number of states in cutting peak demand over the past few years. What has been happening in those states with respect to their economies? Have they been experiencing economic growth along with this reduction in peak demand?

Mr. Geller: First, let me just clarify what they have been doing. I did mention peak demand as the primary objective that utilities gave for their conservation incentive programs, but many utilities are also interested in cutting kilowatt-hour use, actual electricity use. It is not only peak demand. If you look at the products they are promoting, such as lighting products and others, they have certain base-load type of demands.

What we have seen is that the interest in the programs at certain times is high in one part of the country that is experiencing the most severe problems with shortages of capacity or near-term anticipation of shortages in capacity, the lowest reserve margins, the need for conservation being the greatest.

Ten years ago, it was in California and the Pacific Northwest. Both their conservation programs and their cogeneration and independent power programs have been very successful. They brought in thousands of megawatts of new supply through cogeneration and independent power production. Also, they have achieved thousan of megawatts of conservation. Today, those pa of the country have a fairly comfortable situati in that load growth is fairly low and supply adequate for 10 or 15 years. Consequently, th have cut back on their programs, and we ha seen the emphasis shift to other parts of t country now–New England, also some of t states in the upper Midwest. Wisconsin, f example, has become quite aggressive in pursuit of conservation. We have seen fai modest-sized utilities now in Wisconsi Wisconsin Electric Power Co., for exampl spending tens of millions of dollars per year conservation. The need and the emphasis ha shifted around over time.

Utilities in the south have had fairly hi growth rates, in Florida and Texas, for examp over the past decade. They have been pre strong in pursuing conservation and load m agement.

Mr. Runciman: They have had strong e nomic growth. Are you saying that consumpti has been decreasing over that period of time that it has not been going up in relation to economic growth?

Mr. Geller: What we have seen is that if y look back over 20 or 25 years, back in the 19 and early 1970s, electricity demand was going much more rapidly than economic growth. the late 1970s, that situation had levelled c Electricity demand was going up at about same rate as economic growth. Now, in the l 10 years, in the early 1980s, we have seen l grow slightly less than economic growth and, i few years, considerably less than econor growth. We have seen flat load in the Uni States in a number of years. The economy l been going up at two per cent or three per cent year in the gross national product.

This year is an exception to that, looking at early data. For the first half of 1988, we energy in general and electricity demand tak off again in the US. Growth is about seven cent, and overall energy and electricity is ab the same, with the GNP going up around th per cent or three and a half per cent.

I think it is low energy prices, probably a the kind of policy direction–lack of pol direction–we have been getting from the Rea administration that is finally having an effect

Mr. Runciman: Is that an editorial comme

Mr. Geller: Yes. I was going to get back your question. The utilities themselves are n forecasting load growth over the next deca both electricity load growth and peak l

owth, of only about two per cent, maybe 2.2 r cent per year. That is roughly on the same der as what we expect in GNP growth if we do t face another major recession.

Mrs. Sullivan: I am interested in many of the ustrations that you put forward of demand anagement programs. The one that really quite uck me was the one that is being introduced by ntral Maine Power Co. allowing supply and mand reduction projects to bid against each ıer.

I see that the first round of bids resulted in 13 the 15 proposals being conservation projects. ıs this come to the fore yet at all? Has it been plemented? What are the results of that ogram?

Mr. Geller: Yes, the utility itself is in the ocess of negotiating and signing these con-cts. They actually started some years ago in rsuing this bidding strategy, bidding on the pply side, and they periodically put out quests for 50 megawatts at a time as they need w capacity. I think they have gone through mething like 10 or 12 rounds of requests for oposals and bids and contracts being signed. ey have fairly economically and quickly built e equivalent of a large coal-fired plant through s bidding process. They independently began me conservation bids which they have com-eted.

A number of projects have signed with owners facilities–a college in one case and a large fice building in another–to have a conservation oject implemented with a certain amount of vings estimated in a rate of payment for savings at has been agreed upon. They are now, I lieve, in the process of signing these contracts r the first of what they call an all-source bid, ıere they let the supply side and the demand le compete against one another.

30

Mrs. Sullivan: They would identify, say, 15 egawatts and say, "We do not care where it mes from, if it is in new supply or if it is in duction."

Mr. Geller: It was 100 megawatts, in this se, and they said, "We want it as cost-fectively as possible." It is an interesting proach, a market approach to this least-cost-anning movement that is under way. A lot of her utilities have said, "Let's plan, let's study d figure out what is most cost-effective and nk our options," and this utility has said, "Let's the marketplace figure it out for us."

They, of course, can put in new power plants. They know what they think they can build a new power plant for, but they have agreed, under some pressure from their regulators, to go ahead with more cost-effective projects from cogenerators, independent power producers or conservation projects before they go ahead themselves.

It seems to be working pretty well. It is holding down electricity costs. They sold off their share of the Seabrook Nuclear Power Plant a number of years ago and were fortunate to have gotten rid of that.

Mrs. Sullivan: One of the other interesting things about it is that there is clearly a private sector demand management operation in that state.

Mr. Geller: It is starting to take hold. There are independent companies going in now, walking into an office building and proposing to implement a project in that building at no cost to the owner of the building, reducing energy bills for that building and then getting paid for it by the utility. We see that those kinds of companies are much more prevalent in parts of the country where utilities have been promoting this sort of thing, both equipment manufacturers as well as installers; the jobs and revenue of the industry are much stronger in California and the northwest and now it is starting to spring up in New England where the utilities have been encouraging it.

Mrs. Sullivan: That is interesting. Thank you.

Mr. Brown: When we talk about these demand-side management programs and then try to compare them to the US experience, it seems to me that one of the variables will be the cost of energy in the United States, for instance, how much electricity costs vis-à-vis natural gas and alternatives and we then compare that to Ontario's experience. Obviously, if electricity is more expensive in the United States, you could expect these kinds of program will work better.

Mr. Geller: Yes. In general, that is the case. When you have 10-cent-per-kilowatt-hour electricity, as you have in New England, and you have a pretty strong market signal, then the utility can help make it happen. It makes economic sense, but you find that even at four cents or five cents a kilowatt hour, a lot of this conservation is very cost-effective. It is still often a three- or four-year payback for the conservation measures.

Actually, one of the most successful regions of the country in pursuing conservation and this least-cost energy services strategy is the Pacific

Northwest, which is probably the part of the US that mirrors Ontario most closely with a lot of relatively inexpensive hydro power, fairly low rates, a lot of public utilities, the Bonneville Power Administration, a lot of public utilities, some private utilities, rates around three to five cents per kilowatt-hour, but costs at the margin that are fairly high compared to their current average costs. If they go ahead with the coal plant that might be needed in 10 years, that is five or six cents, maybe seven cents per kilowatt-hour. Consequently they push pretty hard on conservation to avoid having the need to go for that coal plant. They have gotten burned on some nuclear projects and that has driven up rates a lot. It had a pretty negative impact on the economies down there.

Mr. Brown: The other thing I was going to ask you about is, looking through the brief and looking at some of the American utility companies, I notice that they are electric and gas companies, a combination. We have heard a reasonable amount of testimony just today, and prior to this, about some conflict between the natural gas suppliers and whether Hydro here perceives them to be a real alternative, that they talk about being in competition with each other and that sort of thing. I was just wondering, do you see that the combination of the companies has some bearing on conservation measures which may be taken; they may have no conflict of interest in pushing gas, if gas is what they think is the better alternative, for example?

Mr. Geller: Thinking about the overall experience in the US, I do not see a big difference between what has happened with the combined gas and electric companies and the electricity-only companies. In both categories we see utilities in some cases vigorously promoting conservation and in other cases not very interested.

Unfortunately, in Washington, DC, where I live, there is a utility, Potomac Electric Power, that has been resisting pursuing conservation for many years. They are an independent electric company competing with the local gas company, and they probably have done more to conserve gas than they have to conserve electricity. They like to go into homes that are gas-heated and help them become more efficient in their space heating. They are not interested in going into a commercial building and giving incentives to put in more efficient lighting products.

Mrs. LeBourdais: I guess I am finding some difficulty listening to an American talk to us about conservation. I speak for myself, but obviously your goals on acid rain emissio etc., would probably have the same end resul

I am just wondering, with the history that t country has had in trying to get agreements decrease acid rain over the years, with very lit success, in implementing any of the technolog that we do have today on both sides of the bord how do we clean up half a lake, half our avera yearly rainfall or half the foliage, etc.? When hear comments from an American President w tells us that the ducks and the geese defecating the leaves are causing part of our problem, h do we listen to all these solutions that technolo would bring about and do it to half a lake whatever?

1540

Mr. Geller: I am as distressed about the government's position on acid rain as you a and I am a little embarrassed to come before y and talk about acid rain. I think it is a r disgrace what they have been saying. The reas that we conducted these studies was to help sh that acid rain cleanup does not have to be costly as some of our utilities have said. T government has bought the line of the utilit that it is too costly, that it is going to put Ohio of business and so on and so forth. We interested in seeing the environment protec and in showing that it does not have to wreck economy to do so.

I can understand your frustration, but I optimistic that before too long we are going to movement in the US. This is my own perso opinion, as I have been observing what happening in Congress pretty closely and I h testified before Congress on this issue. It is going to be this year in all likelihood, but I thi within a couple of years we are going to see

Ms. LeBourdais: It seems to me that young Joseph Kennedy is associated wit similar kind of organization. I am just wonderi if it is affiliated with yours in conserving fue the homes and a variety of different economica based saving programs for home consumptio fuel. I am just wondering if that is related or if is related in any way to this organization y represent.

Mr. Geller: No, he is not involved with organization in any way. He has been working promote conservation and obtain fuel as inexp sively as possible primarily for low-inco households in Massachusetts, before he elected to Congress last session.

Mr. Argue: I have one question. Towards end of your presentation you discussed nonp

pants' costs and issues and how standards re one way of getting over that problem. It has n one issue that has come up several times ing our discussions with Ontario Hydro and ne of the witnesses. I wonder if you could er any guidance or advice on how important should consider the issue of nonparticipants' ts in demand-management programs.

Mr. Geller: This has been a fairly major issue oughout the US every time one of these ceedings occurs at a state level, where a ulatory commission is thinking about whether ities should get more aggressive about conser- ion. The trend has been away from paying a of attention to the no-loser's test or the called nonparticipants' test. It means that a ity will not go ahead with any kind of servation program which might raise rates in short term and thereby hurt the nonpartici- t.

More and more we see utilities and the ulators agreeing that it is a rather arbitrary and sed test which is not applied to supply-side jects–often everybody is a loser when a new lear plant, for example, has been completed constructed in the US–and that conservation grams, as long as they are fairly broad-based, be offered so that everybody has the chance ecoming a participant, that you do not want to ce someone into being a nonparticipant, that have programs for all your customer classes cover a wide variety of measures and so h.

You want to pay attention to equity concerns you do not want to screen out conservation grams. It is a very restrictive test if you are ng to apply it, and overall societal interests are served. You can keep down overall costs for rybody by going for conservation in an ressive manner; it is the cheapest energy ource around. You want to try to avoid ative impacts on nonparticipants in creative ys but not use it to restrict conservation grams.

Virtually all the commissions which have ed on this issue have agreed with what I have said, in not paying a lot of attention to this participants' test.

Mr. Argue: One further question comes out of t. A second element together with the participants issue, and a reason to proceed wly in introducing demand management grams, has been some concern about new nnologies and the administration of these grams. One example given in a presentation was an all-plastic water heating system which was much larger and had time-of-day–

Mr. Geller: Controls.

Mr. Argue: –controls on the heating systems and in that case water pressure had been lost, the plastic had melted and there had been a flood in the basement in one of the test projects.

I would like to ask you from your experience, looking at the US utility experience in demand management programs, what sort of percentages roughly come from what I would call very low-technology items such as weather-stripping, fluorescent lights and so on in comparison to what I would consider to be some of the new ideas such as these new all-plastic hot water heating systems?

Second, when you were just getting into demand management programs such as we are here in Ontario, where would you place the highest priority? On some of the new items being discussed or some of the things like weather-stripping and so on?

Mr. Geller: I had not heard about this technology that melts down in your basement, but in my comments on the nonparticipants' test, I did not mean to imply that one should go willy-nilly into this. I think you want to go fairly slowly and build up your experience with both the technologies and the mechanisms for promoting them. Virtually all utilities in the US generally start with pilot programs and sort of learn as they go and scale up; they do not jump in with a $5-million program in the first year. They scale up to it and build up the experience and the capability.

Also, quite a few utilities have been experimenting with different kinds of program designs. In some cases, they try different rebate offers in different parts of their service area. For example, in upstate New York, with New York State Electric and Gas, Elmira had one program, Binghamton had another and Ithaca had another program at the beginning. They tested out different rebate levels and whether they needed to do a lot of advertising or whether the incentive alone was adequate. They learned from this kind of creative experiment and then based their full-scale programs on what they learned with experimenting.

I think it is essential to start with pilot programs and build up, to experiment with different program designs. Even in the US, there is still a lot of learning going on and I think every utility has to learn on its own how to do it.

The second part of your question was what kinds of technologies are predominant and

whether the new high-tech stuff is the way to go or stick with the insulation and weather-stripping. I think the utilities in the US have covered quite a broad range of technologies. Where the low-tech stuff makes sense, they have been pushing that. I think 10 years ago the programs were oriented primarily around the residential sector–for that, of course, pushing storm windows, weather-stripping, wrapping insulation around water heaters and fairly simple measures. As technologies have progressed and the newer, more advanced, more sophisticated technologies have begun to work their way into the marketplace and become available, the utilities have started to test them out, gain experience with them and, ultimately, started to promote them.

Now utilities are promoting some of the newer state-of-the-art technologies: the solid-state electronic ballast for fluorescent light fixtures is a very sophisticated new technology; optical reflectors, and variable speed controls for motors in industry. Utilities can get comfortable with those technologies. They go out and monitor them in the field initially and see if they work; if they do work, then they can begin to provide information and start to offer incentives for them. We see that happening.

I have followed some of the research projects at Ontario Hydro for a number of years and I think it has done a pretty good job, from what I have seen. It has a pretty good research department on demand-side management in terms of monitoring and testing technologies. It has attended some of the conferences my organization has put on and published papers in international literature. It is as good as any utility on that side of it.

1550

Mr. Passmore: I take it, Mr. Geller, that these energy management or efficiency standard programs you have spoken about today are a result of government policy initiatives and not necessarily utility initiatives. Is that correct?

Mr. Geller: I would say that for the most part utilities are pushed into this primarily by their state regulatory commission.

Mr. Passmore: Then when you are negotiating a bid price and coming to satisfactory terms and conditions which, as you say, help to minimize transaction costs, who arbitrates? This may sound like a fairly simple question for someone from the United States, but it is of interest to the committee here because in Ontario disputes are not arbitrated.

Mr. Geller: You have shifted from a ve general question to a specific question related these bidding experiments. Let me comme further on both. I think initially utilities a generally reluctant to get into this, to start payi their customers to use less of their product. does not seem to go over very well with some the old-line management that you get in many these utilities. They have never been involved the customer side of the meter. That is not th business and they do not want to do it.

By and large, it is something that is press upon them by their utility commissions when t question of where the long-term resource is goi to come from comes up and there is a poli debate over what is the best way to go in terms lowest cost, reliability and least environmen impacts. The commissions are pushing utilit to promote conservation, to give out the ince tives, to acquire savings and to keep down th load growth rates.

Once that high-level decision happens, it is l up to the utilities to implement. The commissi is not in there looking at every little microde sion at the utility level on what kind of progra to offer, where to put the money and how to r the programs. The utilities have a lot independence. I think many utilities get conve ed in the process. Once they try it out, they se can work and that the savings actually can occ Over many years, this has helped them financi ly and in terms of public perception of th company.

The utilities that have been performing w financially, the ones that have not gone in major new nuclear or even coal-fired projec the ones that have been avoiding that are lil more by their customers and are doing bet financially in the US. It is the ones that ha avoided conservation and gone for supply in a way that are in financial trouble.

They begin to understand the potential a accept that it is a legitimate part of their mand for providing energy services as reliably a cost-effectively as possibly. They are the o that are responsible for running the progra and, in the case you mentioned, making decisions as to which bids to accept. It is a ma of judgement. As in any other kind of bidd process, you have to look at which compar seem to be legitimate and can deliver what t propose and at whether what they are propos is realistic. I think there is some periodic rev on a broad basis by the commissions as to w the utilities are doing, but they tend to leave i to the utilities to proceed.

Mr. Passmore: Is there a dispute mechanism?

Mr. Geller: I am not aware of such a echanism for the conservation bidding efforts at have gone forward. It seems to have worked etty well. I would suggest that you check with e Maine Public Utilities Commission or Cenal Maine Power Co. to learn more about what ey have done there. They are the state and ility that have gone furthest with this.

Mr. Chairman: Seeing no further questions, Ir. Geller, I would like to thank you for coming p and speaking with us and giving us some sight into the experience in the United States ith these efficiency standards and conservation.

Could I ask the next witness to come forward, e Independent Power Producers' Society of ntario? The presentation of this association has een handed out previously. I think you all have opies. I believe the clerk is also handing out an xtra appendix here.

INDEPENDENT POWER PRODUCERS' SOCIETY OF ONTARIO

Mr. Teekman: My name is Nicholas Teekan and I am the president of the Independent ower Producers' Society of Ontario. I am joined ere by my colleague Jake Brooks, who is also e corporate secretary. On behalf of our rganization, we would like to thank you for the pportunity to present our views before this ommittee.

Before I begin, I would like to note that we had ubmitted an initial brief back in June. In ppendix 8 of our presentation, there are some ddenda and errata to that initial brief, particulary the last item, which refers to page 11 of our itial brief. We would like to point out that the entence should read, "Ontario Hydro does not se incremental energy costs and an incremental apacity." The "not" in that sentence greatly hanges the meaning of that particular pararaph. In addition, in the brief that you have, the resentation before you today, we have also ound a couple more typos, and that is what is ow being handed out.

Independent Power is a broad mix of local usinesses supplying regional energy needs. ndependent Power frequently develops environentally acceptable energy sources and technolgies. The term "independent power" is synonyous with parallel generation.

The Independent Power Producers' Society of ntario is a nonprofit corporation established in 986. Our purpose is to promote and develop ndependent power production in Ontario. Our bjectives are to promote a better understanding of its potential and benefits, to improve the regulatory and economic environment for independent power production in Ontario and to assist the growth of a manufacturing industry in Ontario to serve both the needs in Ontario and export potential around the world. We have over 30 members, representing developers, manufacturers and supporters of independent power.

I will also hand out our brochure. There is a copy attached to the back of the brief. This is our colour version. In addition, I have brought with us two reports. One is our final argument to this year's Ontario Energy Board and the other is an information seminar on independent power in Ontario, which we held on May 6, which I will leave with the committee.

The independent power producers' story is not getting told. Costs are often misrepresented or misunderstood. The industry is new enough that it finds itself in a difficult position to compete with the volume of technical information built up against it. Our organization is here to contribute to the completeness of information available to this committee on parallel generation in Ontario.

Ontario Hydro says it is encouraging parallel generation, but the facts show otherwise. People in the industry challenge Hydro's assertion of what is cost-effective. Hydro is presenting a self-fulfilling, circular argument. They assume that the present regime will continue and yet their calculations would show, to no one's surprise, that parallel generation will not be a major contributor. The current regime assumes low rates and restrictive approvals processes. If the regime is changed, the numbers all change and the industry could mushroom.

1600

Our presentation will cover the present and potential magnitude of the independent power industry in Ontario; the benefits of independent power production in terms of economic, regional, technical and social goals; the limitations of the DSPS process, and the problem of information overload in general. We will address Hydro's corporate culture and its influence on judgement.

We feel that Hydro's cost methodology approaches are unacceptable, both their standard cost in the DSPS process and the avoided-cost methodology which they are proposing to use for setting buyback rates.

We are here to emphasize the need for an Ontario Energy Board hearing on parallel generation. We wish to emphasize that the Power Corporation Act must be revised to give the

Ontario Energy Board regulatory, not review powers.

Parallel generation in Ontario is an old technology, older than Ontario Hydro. We feel there is potential of about 1,000 to 4,000 megawatts in the near term. This 1,000 to 4,000 megawatts of independent power potential represents on the order of $1 billion to $8 billion in investment by the private sector.

Unlike the experience in the United States where there was virtually no parallel generation in existence when they started their program back in the late 1970s, here in Ontario, as of 1984 when the current parallel generation program was started by Ontario Hydro, there already has been about 1,100 megawatts. Those 1,100 megawatts are roughly divided into 480 megawatts of thermal generation and 710 megawatts of hydroelectric generation.

We have included here for your consideration our scenario for how private power could develop here in Ontario up to the year 2000. In the load scenario, we have just taken into consideration the growth of the system being in the order of about 500 megawatts per year in terms of base load and 700 megawatts per year in terms of peak. The load scenario just suggests private power growing to meet some part of that growth in either base load or peak load requirements.

The high scenario alludes to the current pressure tube uncertainty that Ontario Hydro is experiencing. As you are aware, Ontario Hydro is retubing some of its reactors about five or six years sooner than it had originally anticipated. Right now, they are looking at their older reactors, Bruce units 1 and 2, to see if they have had higher hydrogen uptake than they are anticipating. If this occurs, there may be a hole in base-load capacity which parallel generation may be able to fill in the near term, particularly through use of cogeneration. That is what is implied in the high scenario.

The other aspect of the high scenario is the delays of in-service in Darlington, brought on by the probabilistic risk assessment process for the licensing of that station.

If you look a little bit further down on that page, you will notice the growth in California. This is taken from Jan Hamrin's presentation at the 1987 Ontario Energy Board hearing and our presentation at this DSPS hearing.

You will notice that in California, where they really have no experience with parallel generation, in about two years they had about 200 megawatts on line. If you look at Ontario in 1984, which is when the current policy starte right now there are 25 megawatts in place aft four years, and that in spite of the fact that already have 1,100 megawatts in place. It seem to work while there are no problems wi interconnection and so on. There is a questi here as to why it is coming in so slowly Ontario. What is the difference?

I would like to draw your attention to append 2. Ontario Hydro has predicted that there will about 59 megawatts in service this year, in 198 However, to the best of our knowledge, as today, September 20, there are still only megawatts and no significant changes in th number.

I would also draw your attention to t corrections between the brief and appendix which has been handed out to you. Currentl parallel generation purchases are reported Ontario Hydro under power purchases.

If you could put on appendix 3 please, Jak we will return to this slide in a moment. This their statement of operations. The boxed item where the expenses for parallel generation occ in the financial statement.

If we could go back to the previous slid parallel generation in 1987 represented less th one tenth of one per cent of Ontario Hydro's to capacity of 19,000 megawatts. When y compare the total amount in dollars, $3,270,00 that was purchased and compare that to the to revenues of Ontario Hydro, that represents 0. of one per cent of Ontario Hydro's revenue. It an extremely small portion right now of expens to Ontario Hydro.

If you look down at the table just below th you will note that Hydro feels that by 1989 it m have 220 megawatts and, in general, by the ye 2000 it will have about 1,000 megawat However, in the line which says "March 3 1988," which was the information presented the Ontario Energy Board hearings this year, indicated it had 534 new megawatts of ne projects under discussion.

However, not even three months later, at th demand/supply planning strategy process he there is about another 400 megawatts und discussion. In other words, the industry coming in with 950 megawatts of potent projects which could go in during the next t years, which suggests that Hydro's target 1,000 or 1,200 megawatts by the year 2000 extremely low.

Hydro has not always been quick to move opportunities. Some power, such as paral generation which is already in place like Do

mical's, is ready but locked up. For various ons, there has just not been the satisfactory tractual arrangement for Hydro to use that ver.

the recommendation of the select committee energy, IPPSO particularly urges that the cast for parallel generation development be ne based on more realistic assumptions for allel generation.

here are four economic benefits for Ontario. entially, we are talking about billions of ars of capital investment. Increased parallel eration in the province would provide oppor- ities for industrial growth which are just not izable right now.

econd, it will contribute to Ontario's tax base greater extent than does Ontario Hydro, ause the profits arising from independent er production are taxable.

hird, in principle at least, it would reduce lic sector financing requirements, which ld shift the capital costs of new generation acity from Hydro to the private sector. That is rinciple. I would like to come back to that c later on, though.

ourth, economic efficiency in the medium may be the least-cost option; small can be nomically efficient. But in other circum- ces, other assumptions would be appropri- Different requirements in different places be met by independent power; it is part of its ibility.

ndependent power has significant regional efits. First and foremost is decentralization. creating a lot of small generating stations, the nomic benefits of this particular type of ustrial development are automatically spread und the province. It can contribute to northern elopment, because small hydro, particularly ll hydro and forestry cogeneration, would be ted in economically disadvantaged regions in hern Ontario. Independent power would ulate money in regional economies.

0

rivate power would help rural areas in other ons by distributing productive economic vity throughout these areas. It would contrib- to local self-reliance and help stabilize energy ts. It would create jobs in areas of Ontario re employment is most needed, without sidies. It would help urban areas, as well, ough natural gas cogeneration being located e to urban loads.

am going to summarize here the technical efits, but I am not going into them in great ail. If members of the committee wish to explore these, we will come back to them at the end of the presentation.

Parallel generation provides a balance of supply sources, which leads to diversity in terms of fuel, capacity, location and technologies and it can increase independence, particularly when private power is operated on fuels indigenous to Ontario.

It can increase system dependability. With large, central generating units, you have a more significant loss when one unit is unavailable, as we learned this summer when Lennox was not available and a transmission line was knocked out of service. Because private power, with smaller increments, comes in smaller capacities, if one station is out of service, it becomes statistically insignificant in terms of the total system.

Again, the smaller-capacity increments allow private power to track load growth or demand growth more closely. Shorter lead times, again, make private power more responsive to changes in forecasts of demand as they become apparent.

The decentralized system results in greater security of supply and fewer transmission problems. It helps facilitate rural service by being located geographically close to these customers, and at the same time leads to transmission cost reductions because, again, it can be located geographically close to the load.

It increases planning flexibility by allowing a greater number of options for responding to changing forecasts and conditions. It also allows for better end-use matching of the technology to local resources and to the specific need.

Independent power naturally coincides well with the appropriate technology, least-cost and least-risk planning approaches which are being studied and recommended by various bodies before this committee.

I will turn this presentation over to my associate, Jake Brooks, who will continue from here.

Mr. Brooks: Moving to the social benefits of independent power, I guess we cannot get the whole slide on at once, but that is a picture of a dam being used as a spawning channel, which is just one example.

I think the first point is the main point under social benefits. There are three big principles that independent power naturally supports and leads to: decentralization, diversity and self-reliance.

We have just talked about those in a technical context, but decentralization, diversity and self-reliance all have social and political implications. I think it is fair to say they lead to

decentralized, diverse and self-reliant social and political structures. Smaller management units are frequently easier to handle. Most of what comes later under social benefits follows from one or more of these three principles.

Independent power, in fact, is of social value because in some parts of Ontario it is the only form of power available. It is often cheaper, again depending on the location. It is often environmentally acceptable. It creates a broader, more diversified electric services marketplace, coinciding in many ways with demand management objectives, diversity in a marketplace rather than simply looking at one product.

Local ownership is a common feature of independent power, which means the owners have some personal ties to the region, with obvious benefits for management issues.

Social and environmental costs are a very big issue and very complex, but I think it is fair to say social and environmental costs are generally lower with independent power projects, although there is quite a bit of variation there. There is an appendix to our brief that goes into some detail on social costs.

Just to perhaps underline the breadth of the benefits that independent power produces, when we try to speak to ministries about the benefits of independent power, we find we are frequently speaking to nine ministries, or at least we would like to. There are benefits to the Energy sector, Environment, Natural Resources, Treasury and Economics, Northern Development, native affairs, Industry, Trade and Technology, Mines, and Municipal Affairs. I do not think I will go into the details there; suffice it to say it has many, many implications.

Independent power creates an independent presence in the marketplace and in what you might call the regulatory environment and thereby provides a benchmark for measuring Ontario Hydro's performance.

Next slide: Independent power attracts broad support. I think it is fair to say it is a popular idea. In your copies of our brief, you will see quotes from the current Minister of Energy (Mr. Wong), the former Minister of Energy and a former Minister of Energy before him.

Mrs. Grier: And a future Minister of Energy.

Mr. Brooks: It seems there is very broad support for independent power. I guess we can leave it at that. You can read the quotes and hear the various reasons. In fact, there is another appendix attempting to explain why support for independent power comes from so many sides.

Ontario Hydro's DSPS consultation proc
Ontario Hydro, as we all know, has dramatic
more resources than any other agency in
field. It leads to an elephant-and-flea situatio
guess any consultation process between
phants and fleas is fraught with difficulty. It ta
particular care to emphasize, you might say,
situation of the fleas.

The Ontario Energy Board recently underli
a point that we have been making on and
There are still a lot of unanswered questi
about parallel generation, its value to the Ont
economy and its effect on the electrical syste

The Ontario Energy Board went so far as to
the potential of parallel generation as a sourc
power must be understood before any respo
ble recommendations on Hydro's DSPS pro
als as a whole can possibly be made. One fur
point is that the consultation process does
allow for public cross-examination of testimo

Next slide: You have probably heard
problem mentioned many times: informa
overload. Whenever Hydro activities are
viewed by outsiders, Hydro initiates a l
process of policy formulation and docun
production. It has been said that while ot
present their documents in terms of pa
Ontario Hydro presents its documents in pou
This is inevitably part of the problem. We h
found that however hard we try, with all
information that Hydro presents, it is difficu
question its assumptions and assertions. The
just too much data for groups with resources s
as ours.

The information overload problem dire
affects Hydro's public accountability. Com
tee members, for example, have so m
information to absorb that it is hard to m
recommendations until the end of any sess
Much of the information is very valuable
worth while, but there is frequently too much
to handle it all well.

1620

Perhaps our most important point is that w
presented with a huge amount of informat
frequently what matters most is not what is t
in the information, but what is not there.
example of this problem is the fact that DSP
crucial part of Hydro's planning process,
cludes the years 1990 to 1995 and also excl
considerations of transmission costs. These
key considerations to independent power
ducers.

There are many other examples of informa
that is not there that must be considered f
responsible planning process. There are so m

eimples of unintentional bias in Hydro's dcuments that it becomes impossible to be cical in the fundamental ways; that is, looking f what is not there in that pile rather than what is tre. We urgently implore the select committee tdeal with the information overload problem by lking for what is not there.

With regard to Ontario Hydro's corporate cture, I will pass the mike back to Nicholas Tekman.

Mr. Teekman: Hydro openly admits that its cision-making methods always leave room for hman judgement. Corporate culture inevitably aects those sorts of judgements and consecently biases all decisions. Its influence is trefore quite significant.

In that vein, I would like to read to you a quote fm the Ontario Nuclear Safety Review's thnical report, volume 1, page 17 made by Dr. Inneth Hare, where he says he has been ipressed by several particular points about Otario Hydro. I am going to read one of these io the record. He states: "The senior staffs of Otario Hydro and AECL see the growth of iclear power as a continuing grand enterprise tat depends on their loyalty and pride. This ase of achievement and of common goals still prvades the industry."

The Independent Power Producers' Society ls no problem with the continuing grand eterprise and loyalty and pride of Ontario Hydro t nuclear power. In fact, these are very icessary ingredients for the successful developent of that technology. Where the problem ses is that it is the same people who are pposed to decide between nuclear power and the other options, and of course it is this ntinuing grand enterprise and loyalty and pride hich will tend to, we feel, bias their judgement vay from the other sources and particularly wards the nuclear option.

The Ontario Energy Board, in its most recent R17 report, comments on this in general terms. states, "The board remains concerned about the parent institutional inertia at Hydro and estions whether reforms are deeply rooted."

Ontario Hydro admits this is a problem. edley Palmer, who was in charge of parallel neration for Hydro, when asked at the 1987 ntario Energy Board hearings why parallel neration was assigned to marketing branch, id: "There needed to be a group–I'll put the atter bluntly–that didn't have a pack on its back id built-in biases against the addition of dependent generation on the system." When ked, "Are there areas of Hydro that do have such biases?" Mr. Palmer answered, "I think so."

Just to go into some of the examples here of how corporate culture has biased this whole approach to looking at alternatives in terms of parallel generation, Mr. Brooks has already mentioned that 1990 to 1995 have in essence been left out of the whole consideration here. The mandate of the hearings of the Ontario Energy Board is strictly to look at the bulk power rates of Ontario Hydro, in the case of this year's hearing, for 1989. Parallel generation, being less than 0.06 of one per cent of the total revenues of Hydro, is an extremely minor or tangential issue at the Ontario Energy Board.

With the demand/supply planning strategy process, the discussion is, "What are we going to do five or six years down the road?" For us as parallel generators, and the industry as a whole, the key years are the next five years, and these next five years have, in essence, been dropped out of consideration by either a select committee looking at the demand/supply planning strategy process or by the Ontario Energy Board with its restrictive mandate.

The second item concerns alternative generation being misconceived. The presentations before this committee by Ontario Hydro on the different options are, in essence, made by people from the design and construction division who have come up through the ranks in the nuclear option, and their experience is nuclear and their loyalty and pride and so on are nuclear-oriented. But these are the people who are presenting evidence on wind, orderly hydraulic and these other things.

With regard to wind, they state they have been involved in two projects to date. A question that the select committee might ask Hydro is, first of all, of each of these two projects, how much did each cost; and second, how much of Ontario Hydro's own money is put into each of these projects?

They state, "If you want to build windmills, it takes windmills on an area the size of Toronto to supply as much power as one Pickering nuclear power station." The thing about that comparison is, because transmission has been excluded in looking at the DSPS, they are not taking into account the miles and miles of transmission corridors that are required by large centralized generating stations to deliver that power to Toronto. In addition, it ignores the fact that you can locate a windmill geographically close to the load and, therefore, a windmill potentially does not require that transmission in order to deliver the power.

They talk about orderly hydraulic development requiring extraordinary effort by Hydro. This is not surprising, because for the last 30 years all of the hydraulic people in Ontario Hydro have been moved out by attrition or have gone to other companies, while it has built up its thermal and nuclear sections. Of course, it is going to require an extraordinary effort by Hydro, because it has not built a major hydraulic facility in the last 30 years.

If you look at their comparison of jobs from the different options, there is no mention of how many jobs independent power will produce compared to the options they have presented.

Again, transmission costs are not included in the study. There is an appendix 6 in this document which, if I have enough time later on, I will get to, to show you how significant that omission is in terms of how the ultimate plan may look. I will leave that for later.

Again, nonelectric options are not considered, particularly when they are describing heat pumps versus electric furnaces; it is either electric or electric. That does not necessarily come out in the customer's best interest. Hydro has stated, "Our resource diversity has increased," in terms of the fact that it is now using different types of fuels, whereas back in the 1940s, I guess, they were using only one fuel–hydraulic. However, they have not mentioned that their capacity diversity has decreased because all their stations are coming on in much larger increments.

The final item here, when you look at their research and development budget, is that in 1989 the design and construction division is spending $6.5 million on research and development, of which 90 per cent, or $5.85 million, is going into fusion, a technology through which even Ontario Hydro does not expect to produce electricity until the year 2010, which leaves 10 per cent for all the remaining technologies of fossil fuel, solar, wind programs, what have you.

It is the position of our organization that Ontario Hydro's avoided-cost and standard-cost methodologies are unacceptable. The first item is their description of avoided cost, or the worth of parallel-generated electricity, which is defined as "the cost of what Hydro would have done without the independent generator," and I emphasize "what Hydro would have done."

When you look at the demand options, in this perspective Ontario Hydro is not looking at them from its point of view but from the customers' point of view. They look at the worth of demand options as being defined as supply cost plus utilization cost. This has finally occurred after pressure from both the select committee and Ontario Energy Board to have Hydro finally s applying its no-losers test, which looks at it fr the utility's point of view, and accept customers' perspective for evaluating dem management economics.

However, for parallel generation, they evaluating the economics from their perspecti the utility's perspective, and not their c tomers'. We feel that this flies in the face of founding principle of the electricity uti system here, which is a "power for the peop type of principle, a people-power type of thing took three years to change Hydro's econo evaluation and demand management to customers' point of view.

1630

In the kind of context we are operating in ri now, how long is it going to take before para generation economics are evaluated from perspective too? As it has been described in brief on pages 10 and 11–I am referring to brief which we submitted in June of year–Ontario Hydro does not include full cap cost in its avoided cost methodologies. Thi really difficult for parallel generators becaus the kind of technology that Hydro is bringing line right now. Nuclear is extremely capi intensive.

This leads to our next point, which is that Independent Power Producers' Society of tario supports the proxy plant, total-unit ene cost approach to setting buyback rates. We h included in this brief a buyback rates sched which we proposed to the Ontario Energy Bo at the most recent hearings. I will go into that little bit of detail at the end of our presentatio time permits. Also, appendix 7 contain definition of total unit energy cost.

We also note that Hydro has moved fro least-cost to a least-risk evaluation proce However, Hydro has not defined "least risk whom." Is it Hydro, the government, t customers, ratepayers or the public? It might useful if the select committee asked for a be resolution on "least risk to whom".

In our brief of June 1988, we went ove number of faulty assumptions about the c methodology used by Hydro in its standard c approach. The first one is that it is incompreh sible. The Minister of Energy put togethe technical advisory panel of experts to look at t They do not know what is going on. How anybody else who is not nearly as well qualif as those people be able to understand wha

ng on and be able make good, sound decisions that?

econd, it uses outdated 1985 costs. This ans that in areas such as natural gas, eneration, wind and hydraulic, where the ts have come down, this will be a disadvan- e when compared to nuclear and clean coal, ere the costs are going up. We feel that the eline must be updated to present-day costs.

hird, capitalization of interest is not included Hydro's standard-cost methodology, which urally favours large, centralized generating lities because capitalization of interest is a e component of the final capital cost of lities which take 10 or 15 years to complete.

inally, the service life assumptions in Hy- 's average lifetime costs from its standard- t methodology are open to question. It is not wn if all technologies are assumed to have the e service life, namely, 40 years. We do not n know if nuclear is going to last 40 years, ough you can be sure that that is what it reciated its cost over in this particular parison.

s has been recommended since 1986 by eral bodies–the Ontario Energy Board in 7 and 1988, the select committee back in 6 and the technical advisory panel this year in 8–there has to be a special hearing on parallel eration in Ontario by the Ontario Energy rd, by some independent body that has ulatory, not review powers.

here will not be a significant development of industry, in our opinion, unless such a ring is held. However, if a hearing is held in present legislative context, we would be ding to put the cart before the horse. If we held hearing for three or four months, and say the ario Energy Board said, "Yes, this is what we k is fair," it would not matter because Hydro uld just go out and do what it wants, anyway. s brings us to the next and final point.

he Power Corporation Act needs revision to power the Ontario Energy Board. The Ontario rgy Board, the only agency capable of dling such matters, has no authority whatso- r over Hydro's rates or activities. In order to w, our industry needs such authority estab- ed in law. We are talking here about the tario Energy Board being empowered to ulate in terms of contracts, buyback rates and on between the private power industry and tario Hydro. That is our sole concern in our f before you. There are larger questions than t, but that is our main concern in this sentation.

With Hydro being such a large monopoly, the Ontario Energy Board's having binding authority is crucial for successful, orderly parallel generation development. The Ontario Energy Board, the select committee and independent experts agree on this issue. The technical advisory panel states: "The contract and pricing terms should be given policy review by government and independent regulatory review rather than being set unilaterally by Hydro, as is done at present."

For stable and orderly independent power development, the Power Corporation Act needs to be amended. Right now, as the Power Corporation Act exists in its present incarnation, private power is just not defined. Ontario Hydro is not given official status or authority to set rates; it just has it by attrition because it is not defined. If you want to have a parallel generation industry in Ontario that will have orderly growth over the next 10 years, it has to be entrenched in the Power Corporation Act to give it the kind of stability that investors will be willing to put in the $1 billion to $8 billion, whatever it takes, to build up this industry.

In general, first, the Power Corporation Act has to specifically mandate the role of private power, the goals that the people of Ontario want to realize through private power development and the mechanism for arbitration.

I mentioned earlier when I was talking about some of the economic benefits of private power that it was private sector financed, which takes some of the pressure off public sector financing. However, right now in cogeneration Ontario Hydro has a policy of developing projects strictly for self-generation and supporting those projects with low-interest loans, which goes against the private sector financing of this industry. In Hydro's economics, it is worth it because it is cheaper than building new generation. It is cheaper for it to give these low-cost loans to the private generator.

In our view that just shows that the buyback rates are set too low in general terms. That is something that has to be thought out in an Ontario Energy Board hearing as to what the rate should be. It should be healthy enough to allow cogeneration, small hydro or whatever on its own terms rather than relying on loans from Ontario Hydro. If you are relying on loans from Ontario Hydro, then Ontario Hydro has a further lever on the growth of private power by the amount of money it makes available to this program. The 950 megawatts under construction at the present time may not come to pass because a lot of it is cogeneration and it is probably expecting to be

included in this loan program. If Hydro has only $50 million or $20 million for this program, we will not see even 50 megawatts of that come to pass in the next few years.

Second, in general terms, the Power Corporation Act should entrench social and environmental costs in the power cost principle.

Specifically with regard to the Ontario Energy Board, the Power Corporation Act should empower the Ontario Energy Board with the authority to set, not review, the buyback rates. It should have the binding authority to regulate, particularly in terms of third-party arbitration for contracts.

I know of situations here in Ontario where parallel generators have built their equipment, connected to Hydro, delivered power and still not got a contract, and this over three years. Some of these have been resolved and some of these are still on the go today. The only way to get around that is to give somebody the power to say: "Okay, this is the line here. Take it or leave it."

That is our overview presentation. I would like to review the topics that we have gone over. We have discussed the present and potential magnitude of independent power in Ontario. We have gone over the benefits in terms of economic, regional, technical and social aspects. We have discussed the limitations of the DSPS process, problems of information overload, how corporate culture at Hydro is biasing decision-making, how we view the cost methodology approaches of Ontario Hydro as unacceptable and the need for an Ontario Energy Board hearing and revision to the Power Corporation Act.

1640

In conclusion, if the regime is right, a bigger chunk of Ontario's electricity needs can be supplied by parallel generation on a cost-effective social and environmental basis at least risk to the people of Ontario. Independent power is a good business. We are not looking for handouts, just some balance and a level playing field.

Now I would like to discuss appendix 1 a bit, if you will put that up on the overhead, Jake. We have presented before the Ontario Energy Board an outline of a buyback rate schedule in contradistinction to the way Ontario Hydro is approaching it. I would like briefly to go over it to give an idea of why it is structured the way it is.

First, section A, "Standard Regional Under Five-Megawatt Power Purchase Rates": These buyback rates have been set on the basis of the total unit energy cost proxy plan approach. We have looked at three general regions here in Ontario, which is a reasonable thing to because the province and the utility system very large; therefore, costs to produce electri in different regions vary.

In northeastern and northwestern regions, proxy plant that was chosen is Atikokan bec it is the most recently constructed station Ont Hydro has built up there. That has roughly megawatts of capacity, so that implies a li Look at this kind of 11 cents per kilo buyback rate applying to a block of maybe al 50 megawatts, in that region.

In the central, western and Georgian regions, we have looked at Darlington as b the proxy plant, again because it is the r recent plant under construction in this regior this case, though, the block of energy associ with Darlington is 3,500 megawatts. At 6.5 c a kilowatt-hour, you could see quite a bit r parallel generation coming on, say, 700, 80 900 megawatts at 6.5 cents a kilowatt-hour.

We have also treated the eastern region separate region mainly because of Len which is the main station there. Hydro right is having problems in that area, which brought in the requirement to bring Lennox l in service to maintain system reliability stability in that area. The block of energy w talking about here is 250 gigawatt-hours a cents a kilowatt-hour. So you are talking a parallel generators supplying some portio that 250 gigawatt-hours in this kind of com son.

The main feature about this is that this kir structure, we suggest, should be fixed for t years or 1,000 megawatts. It has got to When there are 1,000 megawatts of si contracts, then this structure stops and everyt has another Ontario Energy Board hearing to "What is the scene now? Is this developing way we want it to? What should be the rate nc this point?" If it has not got up to 1 megawatts in three years, it lapses in three y In three years, you take a look at it anyway

Next, item B, "1989 Special Classific Buyback Rate": This is a rate targeted at brin on a substantial amount of cogeneration in a period of time. This rate would be worth v if the pressure tube or nuclear uncertaint creases; namely, Darlington's in-service are being pushed back because the probabi risk assessment for Hydro is finding unus high concentrations of deuterium in the pre tubes in Bruce.

In that case, for safety concerns, they wish to take these reactors out of service and

out of service for five or 10 years, both to let cool down before they replace the tubes and so they can do their homework to come up appropriate solutions so that when they them back in service they will last for 20 or ears on one set of tubes.

e next item here is a rural power district The rural power district is roughly 3,100 watts of capacity in 1989. These are the ers, rural residents and rural businesses. The of service, what it costs Ontario Hydro in to actually supply power to these custom- verages out to about 8.43 cents a kilowatt-

e feel that a buyback rate on the order of 7.8 a kilowatt-hour will represent savings both ydro and the ratepayers and also give a nable opportunity for parallel generation lopment on this basis. It would be targeted, fully, to bring greater self-reliance to the farm areas.

e final one is remote communities, where ost of service is based on the actual fuel costs o on at the site, which are quite high, 27 to nts a kilowatt-hour.

e can jump to appendix 6. What I am going t on here are three maps. These are taken Ontario Hydro's system planning report SP. These were published in June 1976 and the base filing to the Royal Commission on ric Power Planning in Ontario. I will start the one that says "about four per cent" at the m.

is was Ontario Hydro's system plan at that At that time, the going wisdom as to what oad growth was going to be through the s was 10 per cent. The bottom end of that ction was four per cent, and this is the map see right now. In fact, the load growth has considerably less than four per cent; so this sents a larger expansion than has been ed. It is either because of economic reces- or because demand management or conser- n contributed a lot more than Hydro ever med of at the time.

you could turn to the next one at 10 per cent, was the official system plan back in 1976. outcome of the DSPS process that we are g through right now will be another system that will look something like this in a year or It will, in fact, look quite a lot like it ably, maybe erasing a few numbers.

e main point about this is noting where the mission lines go, and this involves large al generating stations distributed around the ince. However, the next slide and the last slide assume smaller generating stations. Back in 1976, parallel generation was a nonissue; it just did not exist. This would be smaller generating stations built by Hydro located at the sites. The main point in showing this is to note how much less transmission is needed to supply this 10 per cent growth than the previous ones, which assume much larger central generating stations.

That brings me to my main point, that by not including transmission in the DSPS process, you are not going to be able to make a full decision here as to the benefits that could be provided by demand management and by parallel generation, by being located where the load is and the savings that would result in terms of transmission. We consider this a major flaw in the DSPS process before you.

We also suggest that the committee, if possible, ask Hydro for copies of the 573 SP planning document, because it would give you a good benchmark to compare what Hydro is telling you now with what Hydro was saying 10 years ago with its system planning process. That concludes our presentation. Once again, thank you very much.

Mr. Chairman: Thank you, Mr. Teekman. We have a few minutes. Are there questions from the committee?

Mrs. Grier: Let me say I appreciate how much you have given us. I am not sure I can absorb it all. There is obviously room for a lot of questions there, but let me try one. You mention the number of ministries that you have to span and deal with, and yet at the same time, somewhat earlier, you had said that there would be shorter lead times involved in private projects. Can you reconcile those two for me?

Mr. Brooks: The shorter lead times refer to the shorter time to construct a smaller project. It does not mean approvals will be fast.

Mr. Teekman: What we are dealing with here in terms of, say the Environmental Assessment Act, are pieces of legislation that have been designed for the Ontario Hydros of this world and that we have to deal with. There is interest in streamlining this for parallel generators, although this has not happened; this is something that would have to evolve over a period of time. I point out, for example, that for small hydro developers there is a report put out by the Ministry of Energy called Small-Hydro Legislation in Ontario: A Guide to the Approval Process. It lists approximately five federal acts and seven provincial acts which the small hydro developer has to comply with before he can proceed with his project. If you want to build a dam, the first

person you need is not an engineer but a lawyer. That is the situation.

1650

Mrs. Grier: It is not the approval process you are shortening up; it is the actual construction?

Mr. Teekman: Yes.

Mr. Brooks: And the approval process has been designed for large stations.

Mrs. Grier: How many members do you have?

Mr. Teekman: About 30. Corporate members have annual sales of greater than $1 million per year in the private power field and company members have less than $1 million. Corporate members would be about three right now, company members would be about five and, of the remainder, roughly 50 per cent are consultants or people working in the business. The rest are private citizens.

Mr. Runciman: You talked about proxy plant total unit energy cost and you made reference to the capitalization of interest. Those figures are not included in the cost Hydro is providing now?

Mr. Teekman: That is correct. I can give you a for instance as to how big a difference we make. You may wish to look up our brief back on June 29, 1988.

Mr. Runciman: I suspect you would make a major difference.

Mr. Teekman: On page 8 of that, it reads: "The $1,532 per kilowatt, 1985 dollars, for Darlington A nuclear capital cost, which you will find in the DSOS, page 23, is less than half of the $3,234 per kilowatt, 1987 dollars, for Darlington A capital cost, taken from their 1987 annual report." You can see that the numbers which are used in 1985 dollars are less than half of the actual money sitting in Darlington right now in terms of capital. This is contained in our brief of June 29.

Mr. Runciman: The figures you indicated on your slide in respect to a proxy plant were incorporating those costs?

Mr. Teekman: That is correct. We obtained those figures through our participation at the OEB hearings. If you wish to have your researchers look it up, it was obtained from exhibit 6.1.7, from Ontario Energy Board HR16, and these figures were presented on April 14, 1987. These are Ontario Hydro's numbers.

Mr. Runciman: Maybe you are the wrong people to ask about this, but what has your experience been in terms of Hydro's justification for that position in terms of the cost figure?

Mr. Teekman: First, when you are cos something, there are two kinds of dollar se you can use. There is the economic appro which is a constant dollar approach, whic what is used in the standard cost methodo and involves present value analysis. What are trying to do is an apples-to-apples typ comparison. We do not think they have achi that, by the way, in the standard cost method gy, but that is the approach.

Then there is the dollars of the year appr or accounting dollars approach; those are dollars which are actually going to show u your utility bill. That is their prediction of dollars you will actually be paying in a g year.

The DSOS dollars are a constant dollar se They should not be taken as being absol $1,532 is not a real number. It is supposed to number you can compare to, say, hydrauli $2,000 a kilowatt in 1985 dollars. So long as all done using the same kind of modelling allowed in trying to make your decisions a system planning level about which technol you should develop.

I have not been prepared to go into a deta explanation of the difference between the dollar series, but you have to be absolutely c in dealing with Ontario Hydro what kin dollars they are telling it to you in. Is it a cons dollar series or is it a dollars of the year ser The total unit energy cost approach is a dolla the year series, which means these are the ac costs that are going to show up in that yea your utility bill, as an aggregate on your ut bill.

Mrs. Sullivan: I find all of this avoided detail extremely confusing.

Mr. Teekman: It is unanimous, let me as you.

Mrs. Sullivan: I wonder if you could your appendix 1 and give me some kind o analysis from IPPSO's point of view of how would see the value to Ontario Hydro of power. Do you see that 11 cents per kilov say, for the northeastern and northwes regions, as being the actual value of that pow Ontario Hydro?

Mr. Teekman: Again, my point in se avoided costs is it makes a difference whe you cast your economics from the utility's p of view of costs it would avoid versus customers' point of view of the costs they w avoid.

Ontario Hydro would say no, it does not ac these numbers, the reason being that it has

d costs it has invested in the station, the loans s taken out, the debt it has incurred, and it has ay that money anyway, regardless of how h electricity that station produces. It does not hat as an avoided cost to the utility.

owever, from the customers' point of view, point there is that they have a choice. If they a choice between two suppliers, say, they d pay the whole thing to Hydro–capital cost, operation and maintenance–or they could capital cost, fuel, operation and maintenance nother supplier. Our argument is that that al cost is an avoided cost from the custom- point of view. Because the electricity system in Ontario has evolved from the point of of people power, people first, capital costs be included when assessing avoided costs in Ontario because of the unique political ution of the system here in Ontario.

rs. Sullivan: If capital costs are included as of the avoided cost, do you ultimately end hrough the buyback rate, with Hydro paying n operating dollars your capital cost?

r. Teekman: What do you mean by rating dollars"?

rs. Sullivan: In the money they are paying for your supply.

r. Teekman: The private generator has to ver his capital costs.

aybe I can explain it this way. If you go to JS, back in the late 1970s in California where took off, a lot of their generation was lied by oil and natural gas, and the cost of oil natural gas went through the roof.

e thing about oil and natural gas technolo- is that they are very cheap for the capital side but the fuel is very expensive. If you take avoided-cost technique which has evolved that, the capital component of a kilowatt- is quite small; the fuel being so large ved for a larger six or seven cents being the ded cost in California.

ere in Ontario, though, the capital cost takes considerably greater proportion of the six or n cents per kilowatt-hour. Offhand, I cannot you what the percentage is–it is something night ask your researchers to figure out–but king that same principle and bringing it up to Ontario, that leaves a much smaller on of the six or seven cents a kilowatt-hour s an avoided cost in Ontario, savings in fuel n operation and maintenance. Hydro says it mething like one or two cents a kilowatt-

m not sure I have answered your question.

1700

Mrs. Sullivan: I think you are getting there.

Mr. Teekman: Am I getting there?

Mr. Brooks: When a public agency buys service from the private sector, some of this money somehow ends up covering some of the private sector capital.

Mr. Teekman: What happens is that leaves that 1.9 cents a kilowatt-hour as all that the private power producer has to recover his capital, fuel and operation and maintenance. That is all he has. They do not really care what it costs the private producer. They just say: "That is what the avoided cost is to the utility. What can you build for one or two cents a kilowatt-hour?"

The outcome means that right now Hydro is building a facility and can invest $3,500 per kilowatt in that, but the numbers that its buyback rates are set up on mean that the private power producer, who has only 10 years to recoup his investment, really is not looking at anything over about $1,000 per kilowatt that he can afford in capital investment. That means Hydro can put in something that is three times as expensive in terms of capital than we can by this whole cost methodology thing that is applying to us. That is the outcome.

Mrs. Sullivan: The other part of avoided cost I want to pursue relates to the cost to Hydro of the environmental process, all of the approvals process and so on. Just a second ago you said that basically your approvals process is not very different from what Hydro faces. I wonder if your costs are comparable.

Mr. Teekman: The approvals process is different for different technologies. If you are a municipal solid waste guy, then you can get the book thrown at you. Basically, you go through a full hearing. If you are hit with a full environmental assessment hearing, it is approximately 12 per cent–that is the rule of thumb–of which six per cent is engineering costs you would have faced anyway, and the other six per cent is cost for the hearing. That is roughly what it costs.

Most of the small hydro guys do have to do an evaluation of what they think the environmental impact will be and submit it to the Ministry of the Environment. It is read by, I believe, a regional director, who will then decide whether or not this particular project requires a full environmental assessment to proceed. Right now, the projects are so small that if that happened it would be the end of the project.

If you are talking about, say, a 5-, 10- or 20-megawatt project, which is roughly $20

million to $40 million, then you can look at environmental assessment, but if you are talking about somebody who has $500,000, $1 million, that is double his cost for a full environmental assessment.

Mrs. Sullivan: I am sure there are lots more questions, but we have to move on.

Mr. Chairman: I have one quick question. Given that the private power production sector is fairly mature in the United States, if we opened up here and started making it easy to have these projects, what would stop all that engineering capacity and experience coming up here and just building projects as an afterthought to what is going on down there? I guess the question I am coming to is, would we really create our own industry here, given that they now have a jump in experience?

Mr. Teekman: First of all, right now, nothing. Anybody can own a private power facility here in Ontario. There is no restriction on foreign ownership or these kinds of things. Unfortunately, because of the environment we have here, we are 4, 5, 6 or 10 years behind the United States. That is where the expertise is; I acknowledge that. This comes back to our concern about the Power Corporation Act in that private power and its kinds of goals, the way it should be developed, have to be entrenched there. One of these would be that there might be an ownership requirement for a developer, that it be owned at least 50 or 60 per cent by Ontario capital, by Ontario or Canadian people, or the technology has to be 60 or 70 per cent or whatever.

The free trade climate would bring another bend to it, whether or not you would be allowed to give premiums, say to indigenous resources. On the other hand, if it is entrenched as legislation and social policy, I think you can get around the free trade agreement. I think it is something this committee should consider, that in terms of the goals of development of private power here in Ontario, should it be developed with Ontario capital, should it be built with Ontario technology; if so, how much?

You would not want to exclude offshore technology and offshore investment, but you would, I think, want to make sure that the majority of the profits and rewards does stay in the province. You are right, if you do not set your goals, you could get into problems with all the profits going elsewhere, and even though the potential is there for that benefit it will not be realized.

Mr. Brooks: If nothing is done with the Pow Corporation Act, this is most likely to develop the way you fear most. If the Power Corporati Act remains as is, it is most likely that priv power will be developed by outsiders.

Mr. Chairman: Is that what is happening n with the projects that are here?

Mr. Teekman: Not exactly, but when you coming into industrial cogeneration, in partic lar, the equipment is largely American ma You will not be able to get away from that, bu you want to be able to develop an industry here Ontario, you might look at premiums Ontario-built credit in terms of either buyback rate or some other mechanism, or y might put some restriction on ownership.

If you look at, say Dow Chemical, which i multinational organization that wants to buil cogeneration facility, you have to be careful saying: "It is a good idea. They are going to the gas anyway. They are going to use power." But if you, say, put in a 60 per c Canadian ownership clause in order to power–there are free trade problems–you lose a lot of potential capacity.

There are others ways of getting around it could be a developer who owns the equipment is Canadian owned and operated or Ont owned and operated as a facility on Do property, for instance. That might be the way would want to do it.

I agree with your point. It is something I th this committee should think very strongly ab as to what kinds of goals it wants to see reali by the development of private power here Ontario. These goals should be entrenched in Power Corporation Act. In that way, whoev is that is arbitrating, be it the Ontario Ene Board or whoever, when making their decisi can refer back to these goals and this guida given to us by the Legislature to decide whe or not a given project should go ahead or at v price.

You would not want to exclude offsh investment or offshore technology, but might want to favour local stuff.

Mr. Passmore: Just a point of clarifica first, and then a question. I do not wan disagree with the sentiments of the witne with respect to the potential for encoura offshore investors to come into the Ont market, particularly in the cogeneration area I think it is important to distinguish betw types of technology because my understandi that in small hydro, for example–you may ca comment on this–the reverse situation ma

problem; which is that you have got an stry, albeit small, in Ontario that has loped as a result of the small-hydro encour-ıent program over the last six years from the stry of Energy and you have four or five or ıanufacturers all struggling to stay alive on ibly three sites a year. In fact, the market is ow and so nondriven by market realities that act the reverse may be the case in the l-hydro situation.

r. Teekman: Yes. It is a strangulation tion here in terms of buyback rates and oval process. The way it works in the United es, it is my understanding, is that what you do et a licence from the FERC, the Federal gy Regulatory Commission, and you be-e a qualifying facility. Then you automati-get your contract with the utility. You have years to put it in.

ere in Ontario the buyback rates are set by ro at whatever level it feels like. Right now I n the process of dealing with Hydro. You do now when you get your contract. There are erous stages you go through, but none of ı says that once you get to this stage you have contract. The 65 per cent capacity factor rion is a problem. Ontario Hydro is the only y in North American to apply such a gent criterion. It is particularly vicious for l hydro where, if there is a low-water year, as there has been in the last little while, they below their 65 per cent capacity criterion Hydro drops their buyback rate by about 30 ent or something.

)

lr. Passmore: With all of that in mind, then, ould just get quickly to my question: What is evel of urgency here for a resolution of these ers? What window of opportunity are we ing at before we run into the sort of problems have discussed with respect to either too h industry coming up from the US or too industry development in Ontario? What of window of opportunity do we have?

lr. Teekman: My opinion is two or three s.

lr. Chairman: Mr. Teekman, on behalf of committee, I would like to thank you for ing in, for the preparation of the paper you e us and for this discussion. It helped us quite to understand what goes on in independent er here in Ontario.

will ask the next witness to come forward: the adian Earth Energy Association. I believe the nbers of the committee have had the presentation distributed. Mr. De Jong, I guess the name of your association is fairly self-explanatory, but you might give us a little explanation about what it is and then proceed with your presentation.

CANADIAN EARTH ENERGY ASSOCIATION

Mr. de Jong: My intention was to have a three-part presentation, essentially. First, with your indulgence, I would propose to address what ground-source technology is; in other words, what a ground-source heat pump is and what the association is; second, why it is growing at the rate it is; and third, what support we have been receiving from Ontario Hydro and how that support can be expanded and improved.

The technology on which ground-source heat pumps is based is about 50 years old. Public awareness of the technology is relatively lacking since the application in North America is only about half a dozen years in the making.

A ground-source heat pump is essentially an electrically powered machine that recovers heat from the earth or ground water and uses it to provide space heating in the winter and space cooling in the summer. All ground-source heat pumps have two parts: a heat pump inside the house and the heat exchanger outside the house–I say house; it can be a factory, an office or anything else.

The heat pump inside the home connects to a ductwork system which is essentially the same as that which would be used for a gas furnace or an electric furnace.

In heating, the liquid or water carries heat absorbed by the earth into the house. The heat is transferred in the heat exchanger to an adjacent circuit of piping filled with refrigerant, which is pumped to a compressor where its pressure and thus temperature are raised further. The liquid, having given off its heat, returns to the loop and is heated by the soil again. The hot refrigerant passes over a second heat exchanger where air is blown across it. The air is thereby heated and forced through the structure's ductwork system.

Having given up its heat, the refrigerant passes through an expansion valve where its pressure and temperature are dropped further before it returns to the first heat exchanger to begin the cycle again. In air conditioning, the cycle is reversed.

I really do not understand a great deal of that–I am not a technical person–but the way it has been explained to me and the way I think is the simplest is to imagine the house as a refrigerator. At the cooling cycle what happens is that the heat

is taken out of the inside of the refrigerator or the house and put into the coils on the back of the fridge. If you put your hand behind a fridge when it is cooling you will feel that the coils are hot. All this technology does is take those coils and bury them in the ground. The reasons for that I will explain later.

In heating, the process is reversed. The heat is taken out of the earth, through the coils, and put into the refrigerator or the house.

As I said, this industry began in Canada in about 1980 and total economic activity in that year was approximately $40,000. In 1988, the total economic activity at the retail level will be approximately $50 million, an increase of about a thousandfold. The industry is currently expanding at approximately 65 per cent per annum.

There are about 10,000 ground-source heat pumps installed in Canada; 75 per cent of them are located in Ontario and 40 per cent will have been installed in 1988. Ontario is home of the largest concentration of ground-source heat pumps in North America. However, worldwide Sweden is, where there are approximately 200,000 systems installed in a country which has about half the population of this country. We hope and expect to reach that number of 200,000 by 1995.

The growth in the industry in North America has been fostered by two sources: first, consumer demand for energy-efficient equipment; and second, utility support programs. Consumer demand arises from the simple fact that energy savings demonstrated can be as high as 70 per cent over conventional heating and cooling equipment. This can and has been demonstrated repeatedly by studies conducted by Ontario Hydro, the Ministry of Energy, the National Research Council, the Department of Energy, Mines and Resources, the Ontario Research Foundation and half a dozen utilities in the United States and so on and so forth. It is a fact that there is no cheaper method of heating or cooling a house or an office or any other building available today.

The problem with the equipment is that a typical ground-source heat pump installation will cost 20 per cent more than a conventional system; that is, in an average home, about $2,000 more. That is a drawback because, as noted in the report of the Electricity Planning Technical Advisory Panel to the Minister of Energy, 70 per cent of the purchase decisions made on heating and cooling appliances are not made by those who pay for the energy consumption.

The speculative home builder, faced wit decision between an energy-efficient heating cooling system that costs $2,000 more an conventional gas furnace and air-to-air h pump, will choose the latter simply because $2,000 more in his pocket. We have no objec to that, of course.

Public awareness has not yet reached the le where the consumer demands efficient ho cooling and heating, at least not from a t developer. Our market research has shown the very large majority of installations ground-source heat pumps are in what is kno as custom homes–homes built to the ultin home owners' specifications–and in medium small commercial and industrial applications other words, in projects on which the decisi maker ultimately benefits from the decision t to efficient technology.

As I said, another reason for the success of industry in Ontario has been the suppor Ontario Hydro and local utilities. There reasons for this utility support. It is not Ontario Hydro; there are many municipal ass ations in the US, there are utilities in the Un States that support the technology very heav Mississippi Power and Light, for exam Indiana and Michigan Electric, Niagara Moh Power–and they have different methods support, which I will get into later. The rea for this support is that this technology is als effective supply-and-demand tool.

As I said, essentially what this technol does is extract energy from the earth through means of an electrically powered appliance. efficiencies of the equipment will vary gre depending on the manufacturer, the design installation of the equipment, but on aver COPs of about 3.25 can be achieved. A COP coefficient of performance. Essentially, that means is that for every unit of energy put the system, 3.25 units of energy can be extrac

Electric resistance heating has a COP of for every unit of electricity that goes in, one of heat comes out. A typical air-to-air heat pu which is the unit you see whirring away in people's backyards, will have a COP of appr mately two to 2.5.

In comparing COPs, some caution shoul exercised. The principles on which the operate are essentially similar; the differ being that we extract heat and dump heat into earth while they extract heat and dump heat air. The earth remains a relatively constan degrees year-round in Ontario; air, as we kn can go anywhere from, as in this past summe

ees Celsius to minus-20 degrees Celsius. As mperature and heating of the air drops, two s happen. First, the coefficient of perfore of an air-to-air or air source heat pump ; second, the output drops. So you end up an effective coefficient of performance of where between 1 and 1.5.

ere is a second significance to this temperairop; that is, while the air source heat pump benefit Ontario Hydro's load management it is functioning at 2.5 COP, as the erature drops and Hydro's load peaks, the ency of this equipment drops. The advanof our equipment is that the increase in peak iot take place, because the change in outside erature will not affect the efficiency of the ment.

an average Ontario home that is electrically d, the peak winter kilowatt heating demand d be 13.5. In that same home equipped with und-source heat pump, peak winter kilowatt ng demand would be 4.3. What that means at the earth itself is supplying about two or 9.2 kilowatts in the typical installation. her words, we are using the earth as a ator of heating and cooling.

vas curious to note that the immediately ding people were discussing cogeneration. neration is deserving of support, according eir presentation. I will not make any nent on it, but the fact here really is that the is cogenerating. We are getting 85 megaof cogeneration in Canada today from the . There is 45 megawatts input for these 0 systems; there is 130 megawatts output. I there is some discussion about the cost of erage kilowatt to be constructed, but using 3,000 figure, so far the cost avoided by this ment is $25.5 million. Using the $1,500 e, we can have it to $12.5 million or $13 on.

ve cut the growth that the industry has been iencing from 65 per cent to about 50 per levels that we feel confident we can attain, oided peak by 1995 for Ontario Hydro will 700 megawatts. Again using the $3,000 e, the savings in generating construction e somewhere in the neighbourhood of $500 on. Using the $1,500 figure, it will be $250 on.

further benefit of the ground-source heat is that the typical unit is also capable of cing domestic hot water as a byproduct. It arasitic system. That therefore eliminates ontribution to peak demand for hot water production. I should indicate that that is not the case in every system. There are systems which do not have hot water production as a byproduct, but most manufacturers have it as an available option.

If we take the position of the supply-siders, if I can borrow the term, then I would suggest that the use of the earth to generate electricity is as deserving of support and consideration by yourselves and Hydro as is solar, wind or small hydro developments. On the other hand, if we take the position of the demand-siders, the elimination of approximately two thirds of demand in an average house should certainly also be worthy of support.

I refer to the DSPS and the Ministry of Energy critique of it, alluding to the advantages of paying the differential. This is explained as paying the producer for the savings experienced by Hydro. Using the $3,000-per-kilowatt figure and nine kilowatts of savings, the average house equipped with this technology saves Hydro approximately $26,000. The industry does not want $26,000 per house. The industry does not want five cents per house. I am just pointing out the advantages of the technology to the committee. Using the $1,500 figure, of course, it is $13,000 or thereabouts.

The Ministry of Energy's review of the DSPS, at pages 17 and 18, indicates it does not necessarily support providing financial incentives for customers for demand management measures, because it produces no revenue for Ontario Hydro. In the case of ground-source heat pumps, of course, it is not the case. While two thirds of the demand is saved, one third of the demand is still there producing revenue.

It is also possible to argue that to promote this technology is to promote demand-increasing options, a policy which the Ministry of Energy opposes. I suggest that in the case of ground-source heat pumps, this argument is erroneous. The vast majority of new homes in Canada, especially in southwestern Ontario, are air-conditioned. Many Hydro employees spent this summer promoting the sale of air-conditioners and air-to-air heat pumps, and I believe this is part of what has caused a new phenomenon in Ontario, that of summer peaks and winter peaks.

The ground-source heat pump and air-conditioning system saves approximately 50 per cent of the demand. In other words, it is 50 per cent more efficient. Therefore, even homes heated by gas and air-conditioned with air-to-air heat pumps contribute to Hydro's peaking problems. An Ontario Hydro representative who

testified here in August–I believe his name is Dave Comissiong–indicated that approximately 10,000 homes built in Ontario last year were electrically heated. I do not remember a question as to how many homes were electrically air-conditioned; I suggest the number would be 50,000 or in excess.

The distortion on the winter and summer peaks of those two numbers will accelerate, I suggest, unless Hydro does something to affect that distortion. I suggest, therefore, that the policy of Hydro not to compete against natural gas heating in areas where gas is available is self-defeating. While a winter peak is avoided, a summer peak is exacerbated, with no winter levelling and no winter revenue. The installation of a ground-source heat pump would lower the summer peak without distorting the winter peak.

To assess the value of ground-source heat pumps to Ontario Hydro, I suggest a twofold approach. First is the overall long-term strategy of the utility for demand-side management. It may include peak sharing, valley filling, load shifting, load growth, strategic conservation and also quality service with no interference in the customer's lifestyle. Second, what methods are available to accomplish the strategy?

In the last several years, there have been many changes in the way energy is utilized by the consumer. The competition among alternative energy sources is very intense, and because of this competition across North America an electric utility is faced with the prospect of gaining a smaller share of the energy dollar. To prevent this from occurring, new products in technology are being developed.

In the past, the electric air-to-air heat pump has provided the electric utility with the opportunity to capture the heating load as well as the air-conditioning load among its customers. It has contributed to better utilization of generating capacity and increased revenues. However, it also increases the demand on the utility during the system peak.

Therein lies the problem of utility planners. How does the utility gain kilowatt-per-hour sales without pushing the peak demand beyond its set reserve levels or how does a utility reduce demand without losing kilowatt-per-hour sales? This is where the water-source heat pump becomes useful.

Water-source heat pumps can be added to an electrical system usually without supplemental heat. Supplemental heat is necessary in situations where a unit is essentially undersized. Any space can be heated without the use of supplemental equipment. In some cases, a home owner lo at the cost differential between a system th not require supplemental heat and one tha will opt for the former. It is his option. Hov where that is the case, the relative mar additional kilowatt supplemental heating n for air source and water equipment is esse the same.

1730

Water-source heat pumps will help redu sharp heating peaks, improve the overal factor and increase revenues by helpi capture an increasing changeout or r market of heating, venting, air-condit systems and, with the advent of dema water technology, eliminate simultaneous ing, cooling and water peaking loads.

The proof of these statements can be fo many studies that have been conducted North America and Europe. I have repro several of them in the appendices here. I that we are running a little bit behind tim will not go into them in great detail, but th some comments I would like to make respect to them.

The studies essentially found that t source units plus electric hot water h contributed four times more to system loa as compared to water source heat pun winter and three and one half times the am summer. I would suggest that for a utility looking for long-term strategic conservati water-source heat pump is a viable option

I refer you to the first figure that is show appendix. It is labelled, appropriately e figure 1. It shows a heat pump load sha winter peak compared to an air source heat plus water heater. You will note the treme difference in peaking. You will note the tr dous difference between peak kilowatt de especially at hour seven or six and a half the air-source heat pump and water he approaching kilowatt demands of 10, w the water-source heat pump remains a rel constant two throughout the day, thus av both peak and valley anomalies.

The second figure, which is on the pa pages thereafter, is essentially a repeat same study, showing a slightly smaller ho essentially the same characteristics. Ag would emphasize the great difference b the two peaks; in this case only some kilowatts, however it is approximately a 1 cent increase. Those are the two graphs w would suggest are the most dramatic evide

ffect of water-source heat pumps on load ing.

le balance of the appendices is really more led examinations of that phenomenon. I said er that the utility has been very supportive, ve are grateful to Ontario Hydro for all that it one for us. I would like to briefly go through v of the things that they have done before ig what I think they can do in addition.

r the last several years they have been ucing generic brochures and promoting the iology in magazines and newspapers throug- the province. They have produced their own iures extolling the virtues of the technology installed monitoring systems to verify ifacturers' claims of efficiency and load le benefits. We are mildly critical of Ontario o in that regard because the length of time toring is taking is, in our opinion, exces- and second, we have not been provided ss to all the data that have been produced.

itario Hydro does have a program that is vn as the EnerMark program. It is a very il program. Essentially, it subsidizes, igh lower-interest loans, the installation of ric appliances. We feel this program needs icturing to ensure that Hydro is not exacer- g its own peaking problems. There are many of electrical appliances that are qualifying r this program. In essence, Hydro is paying, gh lower-interest loans, for people to install oment that exacerbates their load-profile ems.

i example is the installation of air-source pumps, which, in our opinion, exacerbate ading problems because of the tremendous ential between the time when they are ng at peak efficiency, at say, 2.5, and the when they are most required, which is when mperature is lowest.

hould also say that the Ministry of Energy, ederal Department of Energy, Mines and irces and Ontario Hydro initiated a series of hly liaison meetings at which the process naturation of the industry is discussed and ance is provided by those three bodies. This ss also involves the development of instal- i, performance and industrial standards.

aid earlier that our purpose here is not to t money. Of course, if it were thrown at us, vould take it. But our real purpose is to asize the need for a coherent strategy within rio Hydro with respect to ground-source umps. It is clear to the industry that Hydro, whole, has not yet decided to become a rving utility. Some programs that it advocates are still actively building peak, while other programs are shaving peak. I would suggest that the first and foremost step that Hydro must take is to stop promoting technologies which are damaging its own load profile.

As I said, we are confident we can shave 1,700 megawatts off of the peak by 1995. I am not certain that Hydro is confident of our ability to do that. I am not certain that Hydro has yet developed confidence in the technology. In fact, I think I can safely say that there are situations in which it does not feel the technology is appropriate.

But I would suggest that the potential benefits of the technology are such that it would be prudent for Hydro to establish within its own corporation a task force whose sole purpose is to examine the technology and to attempt to verify the claims or, in our submission, the facts that the industry is promoting. I would also suggest that, in addition to Ontario Hydro representatives, that task force should also include representatives from the Ministry of Energy and from industry.

We are confident that the findings of that task force will be similar to those that were established by Niagara Mowhawk Power Corp., the Mississippi Power Corp. and Tennessee Power and Electric, summaries of which, as I have indicated, are attached as appendices.

We would also suggest that the EnerMark program be amended to withdraw support from those technologies which adversely affect load profile and that any technology that can be shown to benefit load profile be given not grants, but an opportunity to qualify for loans that are interest free as opposed to loans that are 7.9 per cent.

The policy of Ontario Hydro's marketing department to promote ground-source heat pumps, in our opinion, should be expanded. Marketing really has been the driving force within Hydro in promotion of ground-source heat pumps. I think it is because there are people in Ontario Hydro who have been there for 40 years and whose job it has always been to sell electricity.

They have found a project and a piece of equipment that they can sell because it is efficient. It is, to quote one of the salesmen, sexy. It is high technology, although that is a bit of misnomer because, as I say, the technology is about 50 years old.

We also would suggest that something must be done to allow the tract developer, the subdivider, the speculative home builder, to install these systems. Again, we do not advocate grants to either the installer or to the home owner because

we feel that grants have a tendency to distort the marketplace. I think that there are more examples of this that can be pointed to in North America than we really care to look at; for example, the wind-generation example in California. When there was granting available, the industry was doing billions of dollars worth of sales per annum. When that granting was withdrawn, the industry fell flat on its face.

1740

Similarly, in Canada when we had the Canadian home insulation program, when the granting and the support was in place, the industry was doing marvellously, but when the granting was withdrawn, it fell apart. I suggest the reason for that is that the programs were not administered in such a fashion as to ensure that the benefit that was obtained by the home owner was of such an amount as to justify the expenditure. The government or the utility was paying more money for the installation of equipment than the equipment was really worth to the home owner.

We do not want to run into a situation where, if support is obtained from Hydro, two years or five years down the road, after a period of support, that support is withdrawn and the industry falls on its face. We feel the industry can support itself.

We do want to find some way of getting into those tract homes, because of course it is to our benefit and we are in business to make money. It is also to Ontario Hydro's benefit because of the load profile advantages. This may call, for example, for differential rates.

There is some discussion in the documentation about how that would be administered. If I remember the testimony correctly, the position taken by Ontario Hydro was that it would be on a peaking basis and it would require smart monitors or smart equipment that would be able to determine when the electricity was being used. Those would cost approximately $1,500.

I suggest that in our case there would not have to be any smart equipment. If a ground-source heat pump is installed and it is affecting Ontario Hydro's peak by shaving 67 per cent off of peak demand, it does not matter whether that is all the time or not. A reduction in the rates for a ground-source heat pump owner would benefit Ontario Hydro and it would encourage the installation in the tract homes.

In conclusion, I can only say that we are not under any illusions that we can solve all of Ontario Hydro's peak problems and valley-filling problems. We do not claim to be the only people on the block who have a solution partial solution, but the association and ind do feel that we can make a contribution would like, in your recommendations, consideration to be given to the request recommendations that we have made. T you.

Mr. Chairman: Thank you. Are ther questions from the committee?

Mr. Runciman: I have a question abou and the cost differential between putting furnace into your home and putting your sy in. You are talking about, in the average h $2,000 more. Where does that cost differ arise? Is it primarily in the piping that is inv in this kind of a system?

Mr. de Jong: Exactly. As in most heating systems, you have duct work to in you have electricity to run to it and you h furnace to install. Our extra piece of equipm the piping that is installed outside in the gr That is usually at a cost of about $2,000.

Mr. Runciman: What about ongoing m nance? You say this technology is over 50 old. What is the history of that?

Mr. de Jong: I would compare it refrigerator. When was the last time you h repair your refrigerator? This technology is that simple. There is nothing to it.

Mr. Runciman: The only problem that as a significant one is if a leak developed system.

Mr. de Jong: That is correct.

Mr. Runciman: That is a very infre occurrence, I gather.

Mr. de Jong: A very rare occurrence.

Mr. Chairman: Could I pick up on maintenance question? I was a little curi had a quote on one of these systems for my when I was putting in a new furnace. Some seem to remember it was more than 20 per c excess; but anyway, the thing that drove me was this very problem that Mr. Runcima talking about. I had this picture of a 100-foo in my front yard with plastic pipes stuck do and a crack occurring at the bottom, 10 underground.

When I asked the company wanting to s the equipment, "Can I get a mainte contract?"–in other words, "Can I sloug risk off on you if you have to dig up my fron to repair it?"–they would not do it. So I k said "Gee" and went away. I wonder wha industry is doing. Maybe I am odd i

ısions there but maybe I am not and, ɔre, there is a bit of a credibility problem r a distrust in the technology; a leak in a : pipe 100 feet below ground is a pretty sive thing to fix.

. de Jong: I really see two questions there. what is the risk of a leak developing? If a ı is properly installed by a reputable er–and our association is in the process of ʼing installers–there is virtually no risk of a The company I am involved with has ed about 500 systems in Essex county and ve had one leak, and that was because one installers was not qualified.

ıink in Ontario there have been some ɛms and I do not want to gloss them over. were in a subdivision developed north of to and there were some problems with the ;. That was simply because of improper ation standards and improper supervision.

: industry has addressed that and the facturers who belong to the association agreed that they will, as part of the lian Standards Association installation ɪrd, warrant to any home owner that if the ı the ground breaks, the manufacturer will ponsible for its repair or replacement.

. Chairman: For how long?

. de Jong: The warranty for the pipe is for ɪrs, generally.

. Chairman: It sounds like that warranty ot in place when I got the quote because I ɪt have that answer given to me.

Mr. Charlton: Maybe you were not dealing with a reputable company.

Mr. Runciman: Are you represented by firms throughout the province? How available is the product line?

Mr. de Jong: There are approximately 200 dealers in this type of equipment in Ontario.

Mr. Runciman: This is just a sideline, not the sole occupation of these individuals.

Mr. de Jong: It depends upon the individual contractor. The largest contractors, the people who sell the most equipment, concentrate strictly on this type of equipment. The largest dealer in Ontario is one of our dealers in Windsor and he installs simply this equipment. He puts in about 200 systems a year. There are other heating and cooling contractors who have it as one of their lines along with heat pumps, gas furnaces and so on.

Mr. Chairman: Mr. de Jong, thank you for making the presentation to us and explaining the technology and, more particularly, the way it might save some energy around the province. We thank you very much for coming in.

Mr. de Jong: Thank you, Mr. Chairman and members.

Mr. Chairman: I will adjourn the committee until 10 o'clock tomorrow morning.

The committee adjourned at 5:50 p.m.

CONTENTS

Tuesday, September 20, 1988

SELECT COMMITTEE ON ENERGY

Chairman: Carrothers, Douglas A. (Oakville South L)
Vice-Chairman: McGuigan, James F. (Essex-Kent L)
Brown, Michael A. (Algoma-Manitoulin L)
Charlton, Brian A. (Hamilton Mountain NDP)
Cureatz, Sam L. (Durham East PC)
Grier, Ruth A. (Etobicoke-Lakeshore NDP)
Matrundola, Gino (Willowdale L)
Ray, Michael C. (Windsor-Walkerville L)
Runciman, Robert W. (Leeds-Grenville PC)
South, Larry (Frontenac-Addington L)
Sullivan, Barbara (Halton Centre L)

Substitutions:
Dietsch, Michael M. (St. Catharines-Brock L) for Mr. McGuigan
LeBourdais, Linda (Etobicoke West L) for Mr. South
Lupusella, Tony (Dovercourt L) for Mr Matrundola

Clerk: Manikel, Tannis

Staff:
Argue, David, Consultant; with Passmore Associates International
Passmore, Jeff, Consultant; President, Passmore Associates International
Richmond, Jerry M., Research Officer, Legislative Research Service

Witnesses:

From Steven G. Diener and Associates Ltd.:
Diener, Steven G., President

From Sceptre Resources Ltd.:
Haberl, Stephen J., Vice-President, Marketing

From Blue Apple Consulting Inc.:
Jones, Bernie, President

From the American Council for an Energy-Efficient Economy:
Geller, Howard, Associate Director

From the Independent Power Producers' Society of Ontario:
Teekman, Nicholas, President
Brooks, Jake, Secretary

From the Canadian Earth Energy Association:
de Jong, Jacob, Director

Ontario

No. N-18

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy
Electricity Demand and Supply

First Session, 34th Parliament
Wednesday, September 21, 1988

Speaker: Honourable Hugh A. Edighoffer
Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the together with a list of the members of the committee and other members and witnesses part.

Reference to a cumulative index of previous issues can be obtained by callin Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Se Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, To M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Wednesday, September 21, 1988

e committee met at 10:09 a.m. in room 228.

ECTRICITY DEMAND AND SUPPLY (continued)

r. Chairman: Could I call the session to , please? Our first and only witness this ing is William Marcus, an economist. Mr. us has an undergraduate degree in econom- om Harvard University and a master of arts conomics from the University of Toronto. s the former senior economist with the ornia Energy Commission. For the last six , I believe, Mr. Marcus has been in the field onsulting on economic issues related to y. He has been asked to come in today to with the economic assumptions that are d the demand/supply planning strategy. Marcus, I will turn it over to you.

JBS ENERGY INC.

r. Marcus: Thank you. I appreciate your ome. I am also glad to be back in Toronto for the first time in a while. I enjoyed living and am glad to be back.

vill give you about a two-second overview of Energy, since that appears on the front page. are an economics and water resources ulting firm based in a suburb of Sacramento, ornia.

have been involved in appearances before latory bodies in a number of places, includ- lberta and Nova Scotia in Canada and about ates in the United States, on various issues ing to utility economics and planning.

hat we are going to do this morning is ally start with an overview looking at rio Hydro's cost structure, some general ments about utility planning in the 1990s and it is going to differ from utility planning in periods and a brief overview of Ontario ro's planning process, which essentially will he stage for the discussion later on the six s listed on the overhead. I am not going to them off.

e will go on to the discussion of Hydro's cost ture. Basically, an electric utility spends ey on three types of expenses. They have al expenses, which they then have to finance debt on and depreciate the power plants over ; transmission facilities and other items; operation, maintenance and administration expenses, and fuel and purchased-power costs.

Their expenses are divided into four types of costs: generation, transmission, the distribution of power from the bulk transmission system to the customer, which in Ontario is largely the responsibility of municipal utilities, except for the direct-service rural customers of Ontario Hydro, and then administration in general.

Hydro has essentially a revenue requirement of $5.3 billion, as of the year 1987, which was spent on these various items. In your packages, I have given you a table which essentially lays out, to the best we can derive from their annual report, the costs by the type of costs and the service that was provided. I have also summarized them in a couple of pie charts which might be interesting.

The first one is, where does Ontario Hydro spend its money? It spends 78 per cent of its money on generation, of which the bulk is nuclear with 44 per cent, fossil with 24 per cent, and then hydro and purchased power amount to about 10 per cent of its expenses. It spends 15 per cent on transmission and distribution. That is a little less than a fully integrated utility, because of the municipal utility structure in Ontario. It spends eight per cent on administration in general.

The next view graph shows type of cost, and 53 per cent of Hydro's money is spent on financing its debt and depreciating its assets. Of that 53 per cent, 32 per cent is related to its existing nuclear power plants. Its other generation and transmission assets cover 21 per cent of financing. The remainder of its costs are roughly evenly divided between fuel and purchased power on the one hand and operation, maintenance, and administration on the other. Basically, Hydro is a fairly capital-intensive utility which spends fairly large amounts of its money on the servicing of that capital.

Going on, I am going to talk a little bit to give an overview of utility resource planning. What I have basically marked as the conventional theory is how a utility has thought about the world in the past. The utility's job was essentially to build to a load forecast that was expected over time, a plan that would minimize its costs while maintaining an acceptable level of reliability for the load forecast that was expected to happen. What a

utility in fact will choose to build depends on the characteristics of the resources that it has available and what its loads look like.

If a utility basically needed power for just a few hours, just to meet the top of its peak, it would build some kind of a peaking unit, such as, for example, a combustion turbine. That is relatively cheap to build, relatively expensive to run. Utilities tend to choose not to build too many of those units, although they build some of them, because the sustained loads over the whole year make it cheaper to spend more capital to burn less fuel. You essentially have a tradeoff between capital and fuel that causes a utility to add capital if that will reduce its fuel costs over time. These extra capital costs are basically related to the need for this energy over time. They are not related to meeting the peak demand. If you needed just to meet the peak demand, you could build something cheap. Ontario Hydro, for example, builds nuclear and hydraulic stations to save energy, relative to building, say, peaking units.

Now, this whole view of the world has just become much more complicated over the last several years. We have seen some relatively poor outcomes in the electric utility industry. We have had major cost overruns on central generating stations in a number of jurisdictions. We have seen fuel costs go up, then fuel costs come down. People's choices in the late 1970s and early 1980s do not look so good now, with 20-20 hindsight. Essentially, the answer from the electric utility industry has been a major recognition of uncertainty and risk in power system planning.

The costs that we are now talking about are not the costs of, "We know what demand is, we know what all the fuel prices are, and we will build to meet them," but it is essentially a scenario analysis. A utility looks at a number of scenarios, figures out what the expected value is of the costs over various scenarios of demand, of fuel prices, of capital costs for their resources. That is what they are going after.

The second issue that goes along with it is diversification. Putting all one's eggs in one basket does not look so good when demand and fuel prices are uncertain. Utilities have generally started adopting strategies of building plants with shorter lead times, or at least committing some of their generation in that way and hedging; that is, not building all of one generating resource, because essentially, if you guess wrong, you are stuck with all of one resource rather than a diversified mix.

Other issues which we have seen arise last several years are an increased concern environmental quality issues relating to m the generating technologies. You have ac and global warming with coal. You questions of nuclear emissions, and you some environmental effects of hydrauli have to be considered. There is also a ne research and experimentation in new tec gies and in bringing existing technologie the system in greater amounts.

The other thing that has happened in t several years is we have gone from looki "What do we do to meet this electrical dem the minimum cost to the electrical syster asking: "How do we provide the service customers need, the energy services that el ity gives them–heat, air-conditioning, motive power, refrigeration and so forth least cost?" That is a very different que because once you ask that question, you fi other methods of obtaining the same servic be cheaper than just building another gene station and generating the power: A efficient refrigerator; installing weatheri perhaps using natural gas for heating. So these other considerations essentially have brought to the forefront in planning.

1020

What we are trying to effect is a little than just: Given an electric demand, how meet it at the least cost? One of the terms has come up for essentially this focus on t of energy services as a whole–which has up in the United States and you have pr heard a few times–is least cost planning in today's jargon, is planning to meet the s needs at least cost, looking at demand m ment as well as new generating stations.

The last item which I think has change the early 1980s is the development of a power industry, particularly in the United It is beginning to spread into Canada. The power industry essentially says there are players in the generating system who may to generate power and provide it with advantages which I will discuss in a little detail later. It also changes the planning b the utility has to account for these other rather than just saying: "We need it. We'l it."

I am now ready to go on to the next ove This overhead essentially provides what I consider to be a summary of where I am go the rest of the presentation. It is an overv Ontario Hydro's planning process, startin

ptions report, 652 SP, and its reliance on lard costs; then through the development of a ber of representative plans and testing them r certain uncertainties; and then going from essons that Ontario Hydro thinks it learned the representative plans into the strategic iples in document 666. That is basically Hydro proceeded through the process.

the issue of standard costs, basically, the lard cost methodology is a methodology h is specific to Ontario Hydro. It was tially invented here. It is not consistent with of the other methods of economic evalua- used by electric utilities. It was used ally as a screening tool in 652 SP. It blends ost of building new resources with the cost nning the existing system or a system which erated very similarly to the existing system. ing that, what it does is add costs of running xisting system to options which are peaking ave relatively low amounts of energy rated for the amount of peak demand saved. uces costs of certain options which generate energy than the system needs.

typical system planner would tell you, "If I rate energy which is available at the top of eak and in a number of other hours where ic loads are high–such as, for example, weatherizing my house–that energy is to be worth more than if I generate energy ve energy around the clock, including hours e months of May and June when you're ng water from hydroelectric dams and when are not high and you have nuclear power turned back." Essentially, the theory d tell you that peaking power is more ble.

ndard cost methodology does not tell you n some cases. For example, we looked at of the material contained in Hydro's own ple in table F-1 of their report on the ns, on how they did the standard cost od. They found that the life-cycle cost–that he cost per kilowatt-hour conserved–of ng conservation in a new house was 2.7 per kilowatt-hour. That is 27 mills. You hear me talk about mills; a mill is one tenth cent. It is 2.7 cents per kilowatt-hour for y produced basically 30 per cent of the The life-cycle cost of nuclear energy, from same page, was 3.1 cents for energy iced 80 per cent of the time.

en though the conserved energy is more ble, when it started adding in and dealing the costs of the existing system, Ontario o came to the opposite conclusion. It added seven tenths of a mill to the cost of the conservation because it said, "You have to run the existing system more." It subtracted 11 mills, or about 34 per cent, from the cost of the nuclear generation because it said, "It would cause you to run the existing system less." The conclusion that the standard cost methodology would tell you in this example is that, absent some of the effects on the operation of the transmission and distribution system, you would choose to build the nuclear plant, which costs more money and generates less valuable energy, before you would choose to adopt the conservation program, which costs less money and generates more valuable energy. It just does not fit together.

The other thing that the standard cost methodology did was Hydro used it to screen out certain options and, in particular, because of its very high fuel price forecast, it simply screened out all options relating to gas-fired generation, except for the conversion of the Lennox plant. Ontario Hydro then took the options which it kept in from the standard cost methodology and created representative plans. I think Hydro actually took a good first step, and I will underline "first step," in planning for uncertainty. It put together 16 plans. It looked at a number of scenarios. But it is only a first step because it did not adequately look at some of the uncertainties.

I will go into this in quite a bit more detail later, but the particular four issues where I think it could have improved its techniques and come up with some possibly different results are the questions of how it dealt with uncertainties in demand, uncertainties in what the price of fuel is going to be over the next 20 years and more, uncertainties as to the cost of nuclear generation and uncertainties in how much is available from demand management and parallel generation and what it is going to cost.

My conclusion, which I will again come back to in a little more detail, is that the differences in cost among Hydro's representative plans are likely to be less than the margin of error which was caused by the fact that it did not evaluate all the uncertainties that are out there. Essentially, what we are looking at is representative plans, most of which can be characterized as costing about the same. Hydro then went on to look at the strategic principles. They were based in large part on the lessons from the representative plans. One of Hydro's major lessons from the representative plans was that options with nuclear tended to be cheaper. Because the margin of error was fairly great on these representative plans, draw-

ing very sweeping conclusions from them may not be warranted.

I think the other issue that comes from the strategic principles is that most of these principles were relatively broadly stated by Hydro. There is a great deal of interpretation on how to develop the principles that Hydro wrote in chapter 11 of its document into a plan. It is essentially something where there is a lot of flexibility left to the utility; reasonable people can differ on what Hydro's own principles mean and how they should be implemented. I do not think it provides a lot of guidance. That is one of the things that the technical advisory panel said in great detail. I agree with it; I am not going to repeat what it said further, but it is an important point.

However, they did have some exceptions. They were very specific in a few areas where, ironically, I think they probably did not have enough information to be as specific as they were, and I call out two examples of them here.

1030

The first one is that one of their principles, or actually it is a subprinciple, is that customers must pay a substantial portion of the cost of demand management. I think there are certainly cases and conditions where that will not lead to saturation of the market. It is too early to state that as a major principle from the information that Hydro has.

The second one which I am calling out here is that they said they would not offer standard contracts and standard rates for parallel generators who are bigger than five megawatts. They said: "We don't know how much parallel generation there is out there. We haven't got any supply curves, but we want the right, right now, to pick and choose the parallel generators over five megawatts and try to negotiate."

Okay, now I am going to go into my first topic, which I will cover fairly briefly, which is the question of the economic evaluation of demand management and parallel generation. Essentially, utilities need to have some type of long-run marginal or avoided-cost analysis for several reasons. The first is to set prices for parallel generators. The second is to evaluate whether your demand management programs are cost-effective or not.

Surprisingly, there are other areas where utilities need to know what their long-run costs of generation are. They have needed it for years, for example, to figure out whether it is better to buy a transformer that costs less money, but wastes more energy, relative to a transformer that costs more money, but wastes less energy. Th
other areas in utility businesses where yo
this information.

There are four basic methods which eco
theoreticians have developed for the eval
of long-run avoided costs. I am not going
into them in detail here. They will be in th
report that we will table with the committe
week, but the one point I want to leave yo
is that any method, whether it be somethi
Ontario Hydro's standard costs or whethe
some of these other methods proposed
United States, simply does not make sens
long-run costs are less than the cost
generation that the utility would have buil
cannot tell me that your long-run avoided
a year is five cents when you would have
generation plant that cost six cents. That jus
not make economic sense.

Some of the methods that are used to do
evaluations, including standard costs and i
ing Ontario Hydro's incremental cost m
which they have used in working out p
generation prices, have the potential to crea
result, which is essentially not reasonable.

The other area I want to talk about bri
what other costs can be avoided besides
costs of generation. There are three compo
There are, essentially, transmission and dis
tion costs. The bulk transmission system c
smaller if demand is less. The local distri
systems can be less heavy and less expens
demand is less. Even the distribution sy
which are connected to the customers own
can be less heavy and less expensive if you
that the customer's demand is less when yo
building it, such as in a new building.

So demand management programs will
savings, not just on the generation side, bu
will carry down through the transmissio
distribution system. Those numbers can be
large. Pacific Gas and Electric Co., for exa
found that demand management will save s
thing like 92 per cent of bulk transmission a
per cent of distribution costs at the pri
distribution level over the long term. That
sound like gobbledegook, but it is an amou
money that is approximately equal to the c
building a combustion turbine peaking
when taken out over time. It is US$450
kilowatt. Essentially, you have to look at
savings on the cost of the system. You ha
look at the fact that you also save all the
losses down to the customer when you
looking at a demand management program.

ıe other area where you have to look at ıgs is the reserve margin. A utility needs a ve margin basically to guard itself against ts that people are not expecting: outages at or three large plants at the same time and er demand than expected because of unusual her conditions. Ontario Hydro has a reserve in in the vicinity of 24 per cent.

hen you bring in a demand management ram, that program will tend to save not just mount of supply, but it will tend to save the ve margin on that amount of supply. You erve a kilowatt, you save one and a quarter, ding the reserve margin, because you can ıtially predict what the demand management ing to do once you have it installed because it read over a large number of customers. You estimate, by techniques that utilities use nely in doing demand forecasts, how much ved. You do not have to plan for the reserve gin on that.

hen you look at parallel generation, you pt that savings are less than addition to basic ration costs, but you can still save some of ransmission costs by dispersing your genera- around the province rather than building it in centralized sites.

ou will also save a portion of your reserve gin there because essentially you are building hese very unusual events. For example, if had a 900-megawatt nuclear station, the ability that it is not in service is going to be ewhere between 10 and 20 per cent, the ability it is not in service at the time of the em peak.

you build, say, 900 megawatts of parallel rators, spread over a variety of sites and a ety of technologies, you will never lose the e 900 megawatts because it is just spread too many projects. The probability might be in 20 billion that you would lose all 900 awatts.

ecause you are not looking at these extreme ıts, you can tend to operate with a lower rve margin on a system which has smaller rating units. In fact, the Alberta Electric ity Planning Council did a study of that and ıd that one of its 375-megawatt coal stations d be displaced by only 310 megawatts of ll thermal stations fired using wood waste ıuse of the smaller size of the stations. The a 65 megawatts that would have been needed naintain reliability was not needed with the ller stations.

he next topic I would like to talk about is the stion of the discount rate. The discount rate is a very important concept. It is the interest rate which is used when you are comparing the costs of various options over time. A dollar tomorrow is not worth the same as a dollar today. The question becomes, "What is it worth relative to a dollar today?" That is what the discount rate is supposed to answer.

When you use a low discount rate, you tend to value what happens in the future more heavily than if you use a higher discount rate. As a result, lower discount rates favour investments in capital-intensive technology, such as nuclear power plants, as well as in hydraulic units in some of your demand management projects, over technologies that burn fuel. You look at the capital costs today and you say that capital costs today save more fuel later if you have a low discount rate because you are evaluating the world as if the future were more important.

A discount rate can also be considered as related to an interest rate of some sort. It is the interest rate you put on the capital for recovering it. That is another way to look at a discount rate.

Ontario Hydro basically uses a four per cent real discount rate. I say "basically" because it used a four per cent discount rate throughout the base analysis for standard costs. In its representative plan analysis, it uses numbers that started out somewhat higher than four per cent over the first five to 10 years and ended up lower than four per cent 20 years in the future. It uses numbers in the range of about four per cent, real.

At today's rate of inflation, that would be equivalent to saying Hydro could borrow money at 8.5 or 9 per cent. They have used some numbers that are a little higher because they have higher inflation rates in their forecast, but that would be saying that they could borrow money at 8.5 or 9 per cent and that is what we should use.

1040

It also assumes that the value of the faith and credit of Ontario, which backs Ontario Hydro's bonds, does not cost the provincial taxpayers anything. In fact, use of the faith and credit of Ontario does have some cost to the taxpayers when we go to borrow money to finance other government debt for other public projects. What the value of that guarantee is has been discussed in several studies. There was one done by Coopers and Lybrand for the Alberta government telephone company that showed it was about 1.5 per cent above the interest rate. Your Ontario Energy Board recently adopted a number of 0.5 per cent as an interim value for that guarantee and said that is what it is worth to Ontario Hydro.

If Ontario Hydro did not have the guarantee, it could not borrow as much money. They would have to have a capital structure which had more equity in it; that is, they would have to raise their rates to collect more money from the customers to cover part of the cost of their system. Municipal utilities in the United States typically have 60 per cent debt and 40 per cent equity. Ontario Hydro has over 90 per cent debt and less than 10 per cent equity. The only reason they can get away with that is the guarantee of the faith and credit of the taxpayers of Ontario. They could not maintain the credit rating they have without that guarantee.

Another issue that comes up is that using a very low discount rate is equivalent to using the assumption that capital is not a scarce and finite resource, that there is a lot of it out there that can be borrowed at low prices without raising the cost to other people. In fact, what happens is that if Ontario Hydro soaks up capital to make investments which yield 4 per cent above the rate of inflation while there are other investments in Ontario, in the business sector, that might yield 10 per cent above the rate of inflation, because businesses have to pay corporate taxes, the province as a whole is going to end up poorer for having directed that money into these 4 per cent above inflation investments from Ontario Hydro.

In addition, if you are looking at Ontario Hydro as representing its ratepayers, and the ratepayers' choice of the present versus the future, then you have to look at the ratepayers' cost of credit. You cannot borrow money for 8.5 or 9 per cent. Your mortgages cost 11 or more. There are credit cards and car loans and other items which have very high interest rates.

Given that consumers pay higher interest rates than utilities pay, they would rather see their electric utility not investing in capital to earn 8 per cent, but leaving the money in the ratepayers' pockets so they can pay off their 12 and 15 per cent debts. Consumers would not want the utility to make any decisions to spend more money now to save money later, unless those decisions return at least as much money to the consumers as their own interest rates. Based on this discussion, I am making a recommendation that Hydro investments should be evaluated, using a higher discount rate as a base case.

I suggest six to seven per cent real, because that is essentially within the range of the cost of capital of most of the private utilities in North America, assuming a little more equity and a little less debt. A sensitivity case using a discount rate in the 8 to 10 per cent range should be run to determine the impact on the economy and consumers.

The next issue I am going to talk about briefl and I know you have had quite a few witnesses this topic, so I am going to be fairly brief, is t question of policy with respect to paral generation. As I mentioned before, Onta Hydro does not have that much information in t parallel generation area.

They do not have detailed supply curves what the potential is, depending on the pric They have not figured out how the potent varies with economic conditions, when, if y have a booming economy, you have mo potential to put in cogeneration because you ha more industrial plants and activity which can u it. They put relatively arbitrary amounts in th representative plans. They put 550 megawatts some, they put 1,200 megawatts in others a they use the same distribution over time regar less of load growth and regardless of econom conditions.

Despite having this relative lack of inform tion, they have made the very specific reco mendation that negotiations are better th standard contracts. I think Ontario Hydro, in t near term, needs to get information as well as buy power. By acquiring private power resourc in the near term, they will be acquiring inform tion on what is out there and how much is like to be available, as well as acquiring elect generating resources.

At the early stage of the development of private power industry, I think it is important start with a relatively accommodating a aggressively accommodating policy to priva power. I would say you start with full avoid cost, with a standard contract rather th something which has to be negotiated every tir with Ontario Hydro. The third thing you wou put in–and this is a lesson we learned California–would be a limit on how ma megawatts would be available before you cha ged the price. The reason you need that limit that you may find there is a lot more out the than you were planning on.

That is what we did in California. We pu contract out on the table expecting to sign 1,000 megawatts and we signed up 5,0 megawatts. They did not pull the contract f enough and we went from undercapacity to relatively capacity-rich or surplus position. W certainly proved that if you put a standa contract and a good price out on the table you w get the private power resources, but we al proved that you need to have a megawatt limit

otal amount you will put out for sale at a n price before you change the price.

, instead, you move in the direction of otiating contracts, as Hydro proposes for ybody over five megawatts, the first thing have done is increase everybody's adminis-ve costs. You have made work for Hydro's neers. You have made work for Hydro's nomists and lawyers. You have created an istry for consultants such as myself. While I business, I am not sure that is a reasonable of the money of the small power producers er than building projects. You have created a ket for lawyers out there. You have just eased the cost of transactions fairly dramati-y.

he other thing Hydro has done is say, "We t to look at your rate of return so we can re out what we should pay you." If you give it ice, gold-plated project you will get more ney than if you are lean and mean. That is not right incentive to offer the private sector. t is the way electric utilities have been doing iness for the last 75 years in North America.

he third thing that is happening is that you e a monopoly buyer. That has to be recog-ed here. If I cannot sell my power to Ontario dro, I cannot take it down the block and sell it somebody else. It owns the transmission tem. If I have a nice factory, I might be able to some of it in-house, but that would be my y alternative. When you are dealing with a nopoly buyer which has a stranglehold over transmission system so you cannot move the wer out, you have to deal with that monopoly wer.

It promotes distrust to move immediately in direction of negotiations. The power corpora-n has the ability to say, "Take it or leave it," cause you have nowhere else to go. We have en that negotiation can lead, in addition, to the ed for more regulatory oversight looking over shoulder of the process to make sure it is fair. lo not think, at this early stage, it is a reasonable ing to do.

The other area where there has been quite a bit discussion is the question of bidding. Bidding, hink, has a little more promise in the long term a means of organizing the market, if you find ou have a lot of potential.

Again, it is not something you want to do morrow; it is not something you want to do hen you are trying to start an industry and get an frastructure off the ground. You need to have e structure. You need to have the familiarity ith private power and the knowledge that there are projects out there which can make money and that there is an industry before you move into bidding. If you move into bidding prematurely, you are likely to reduce the diversity of resources, particularly if you say cost is the only criterion. Everybody will build whatever is cheapest today.

You will tend to make life a little more difficult for small firms, particularly those building one project, which becomes much more risky than somebody building 12 projects because it is win or lose on the bid; and if you start bidding before you get the experience with the industry, some people who do not know their costs could bid too low and fail and could essentially give the whole industry a black eye.

1050

You may want to go there five years from now or 10 years from now if you find you have a lot of potential for small power production, but that is not what you want to do tomorrow.

The next slide briefly outlines the benefits of private power resources. I know you have heard this one before. They have short lead times. The short lead times should be used creatively by the utility as a means of reducing its need to commit to new generation: "We know there's going to be some small power out there so we don't have to build something with a 10-year lead time."

However, what has happened in a number of states in the United States and was proposed by the utilities in Alberta, although the government in Alberta did not do this, was to use this lead time to discourage small power production: "We don't know if there is any small power generation out there and we need this plant that has a 10-year time. Therefore we'll build it. We're committed. Now we don't need you small power producers. We have excess capacity for the next 15 years."

You cannot get there from here. If you do something like that, you have taken the advantage of small power production and turned it to the disadvantage of small power production and wiped out a reasonable resource option.

The second issue is that small power producers are paid for performance. They get paid in cents per kilowatt-hour. They do not get any money if they do not produce any power. If you pay on a forecast, you can lock in the cost and know you are not going to get any cost overruns as you would on utility generating stations. With the payment in cents per kilowatt-hour, if the plant does not work very well, it is not paid. You do not have to continue paying the capital cost on a plant that is not running, as you do, for example,

with a nuclear unit which might be out for a couple of years for retubing.

In addition, you can develop a mix of contracts all based on avoided cost principles but structured a little differently from the price side which allows yourself some hedging against uncertainty. If you have a few projects which are gas fired and have prices which have the cost of gas as one of their indexes, for example, you can hedge. You can also have some prices which are forecast and some prices which rise with inflation. You can essentially take the one resource and, through the type of contracts, hedge. It also brings you resource diversity. It brings in new players. It brings in technologies which are not currently in use in Ontario, and that has a benefit.

We will take the next slide. We are going to switch gears to the question of building and appliance standards for conservation. This issue is one of the few places where I am going to sit here and toot California's horn. This is one of the areas where I have to say we did it right. Ontario Hydro has basically come out in support of what are called consensus standards: "We'll all sit down. We'll all talk about it: the appliance dealers, the home builders, the government, Ontario Hydro, a few other people. We'll talk about it for quite a while and then we'll come up with something."

What you will come up with will yield 100 megawatts of savings by the year 2000, according to Ontario Hydro's documents. Our experience in California is that you can get much greater savings than this 100 megawatts over an eight-year time period. California has had appliance standards and building efficiency standards since 1977. I have listed out most of the standards on this sheet. They also have standards that say you have to use low-flow shower heads and low-flow faucets.

There is a large potential for savings from conservation. We are already saving over 500 megawatts on average and 750 peak megawatts in a state that is essentially twice the size of Ontario Hydro. You can scale all these factors by a factor of two in thinking about this chart. By 1992 we are projected to save over 2,000 peak megawatts from our standards. By 1999 we will be saving close to 4,000 peak megawatts. Essentially the savings by appliance range from 25 to 75 per cent for the various residential appliances according to data put together by the energy commission staff.

We are also saving 15 to 25 per cent in commercial lighting from the standards we have on lamp ballasts. We are also strengthening the standards over time. I will give you an exam Essentially the standards can be used to kee with technology.

Our first standard for a 15-cubic-foot refri ator said that the minimum unit on the market to be 1,300 kilowatt-hours per year. In 198 just ratcheted up the standards, so that same has to use slightly less than 900 kilowatt-ho In 1992 the number is going to be 650. We trying to make our refrigerators more effic over time to keep up with the changing t nology.

I would point out one thing in respect to standards are important in Ontario. Essenti the United States is moving towards efficie standards not as stringent as California's, towards some level of standards across country. I can see the great potential for say "We have some inefficient appliances l Where are we going to take them? We are go to take them to Canada where they do not h the standards. We are going to give you energy pigs."

I do not think that is a reasonable thing Canadians to let happen to them. I think tha one reason for bringing in some stand consistent with and at about the same time as United States.

The next thing in your package is just a ta explaining the savings from California's p grams. The next picture shows the ma decreases in energy consumption of the r appliances and end uses for the northern Cali nia service area. You can see from this chart every end use is dropping by large amounts fr 1977 to 1992 because of these building appliance standards that we have brought in.

In California, for example, you cannot pu resistant space heating. That is not legal more in any part of California. You have to pu heat pumps if you are going to put in electric all. There are some areas where they will tell that they really want you to put in gas. There increased savings in hot water from the standa on the efficiency of water heater blankets from the standards on shower heads and faucet

There are increased savings in central conditioning, both from the building standa which say that the house has to be better insula and from improved efficiency of the conditioners themselves. On refrigerators freezers, you see major progress. There is a lit less progress in room air-conditioning, but y still see some decreases.

Why do we need standards that are fai strong? We have seen a study in California t

vs that 70 per cent of the people who buy gerators will never pay the electric bill on e refrigerators. Landlords and new home ders are the bulk of the market. If you do not them to go out and buy an efficient gerator, they are going to go out and buy the ipest one they can stuff into the unit. They $50 and cost the tenant $500 over the life of equipment.

his is a symptom of market failure. Unecono- decisions are being made by customers. The er item is that there is a lack of information. isumers may not spend enough time thinking ut what the electric impacts are of their ices in buying refrigerators or other appli- es.

0

he third item is that you can get the same ings without having to have the utility as deep the conservation business as you would erwise. Now, do not get me wrong, I am not ing you there is not a major and extremely ortant role for electric utilities in providing nand management services themselves. What m telling you is you can achieve the same ult more cheaply if you start with standards l then put utility incentives on top of the ndards, saying, "We will tell you what the nimum is and the utility will give you an entive for buying something that is better than minimum." That is what we have done in lifornia, and it has definitely kept down the st of the utility programs on appliances.

To change topics again, to my fourth item, the nsideration of risk and uncertainty by electric lities in their planning, this is the issue I briefly ent over. I said this is why the 1980s and 1990s different than the 1970s. We need to consider k, because not considering risk creates the tential for very poor outcomes. You can get cess capacity; you can can get caught with all ur eggs in one basket and then find that the fuel ices make the eggs that you put in there not ok nearly as good as they did when you started.

The extreme condition here is the question of e Washington Public Power Supply System. is is the extreme case of people who did not ok at risk and did not diversify. They spent $11 llion, they got one plant. They do not need that ant until 1991 and they had enormous cost verruns, because as they were going ahead and uilding as hard as they could, working to build ese five nuclear plants, the demand for those lants simply evaporated.

Because of price and elasticity of demand, hen people finally had to start paying rates that had some of the costs of the nuclear plants in them, you had the phenomenon of what I call the self-extinguishing power plant: you need it only at prices that do not include the cost of the plant. There is your extreme case of not looking at issues of risk.

We have four major types of risk that a utility has to look at. The first is the question of demand, which can create excess capacity and can also create shortfalls and make you scramble to do something in short periods of time.

Second, you have changes in fuel prices, which will cause shifts in the amount of the various demand/supply options that would be economic. You had the upward runup in oil prices. You also had the downward decline in oil prices, which, for example, in California right now is causing utilities that burn gas to sell that gas to utilities that would otherwise burn coal in the southwest, because the gas is cheaper. They have idled some baseload coal plants in the southwest to burn gas.

Third, you have changes in capital costs, operating and maintenance costs and the operating characteristics of units. If you think the capital costs of a plant is X and it turns out to be three times that, you may have made the wrong choice by putting all your eggs into building the plant that has the cost that overran.

The fourth point is what I call a "common mode failure." I define a common mode failure as a heavy reliance on a single technology in your electric generation system, so events that affect that technology would have drastic effects on an electric utility. I can give you some examples: another oil price shock if your utility were heavily dependent on oil; acid gas controls if you were dependent on coal; some type of event that would require the shutdown of a large number of nuclear stations all at the same time; or drought and poor water conditions.

If you have a diversified mix, you can live through these things; if you have an undiversified mix, it becomes more difficult. You become subject to having a common mode failure that might not have a very high probability of occurrence, but if it happens it will make your lives miserable.

What are the utility responses to risk? The first one is risk aversion, which I characterize as looking like insurance. You may choose to pay a little bit more to get a little more certainty. I do not think I am going to die tomorrow but I have a life insurance policy. It is the same type of thing. I may spend a little extra money but I have

protected myself against something which could have a bad consequence.

The second is diversification, which I have labelled "mutual fund," because it is basically saying that if you have a mixed portfolio of resources, the risk will be less than having only one or two resources available to yourself.

The third response of an electric utility is what I call flexibility, which I will go into in a little more detail. Flexibility says that a utility may find it valuable to delay commitments until it obtains more information: on demand, on fuel prices, on where the industry is going.

There are some promising options out there which, if they occur, may be very useful. For example, there is a steam-injected gas turbine which could cut costs by more than 20 per cent from a combined-cycle unit burning gas. It is not commercially available now but we will have a lot better idea whether it will be in five years. Making a decision now may foreclose the option to install these.

We also do not know what fuel prices will be 10 or 15 years from now. The decision you make depends on what your forecast is or what your range of forecast is. Five years from now, you still will not know what fuels are 10 years from now but you will be a little closer to them in all likelihood.

By delaying commitments, utilities will choose resources with shorter lead times over resources with longer lead times which have approximately the same cost, and will pay some cost premium to get a shorter lead time. Shorter lead time resources tend to be fossil resources, smaller resources and demand management and parallel generation.

The second strategy on risk is what I call acquiring options. An option can be getting a site approval for a plant or, in the case of a parallel generator, saying: "We'll pay you some money to get yourself ready to come on line at date X. We don't want you now but we want you in 1996 and we'll option in 1993 to tell you whether we want you to come on line in 1996." The option strategy can give you resources you know you can bring on line in times of relatively high unexpected demand.

One of the ways in which options are proposed to be used in the Pacific Northwest, where this concept was developed, is that you would acquire options for some very high load forecast, such as a load forecast that had only a 10 per cent probability of happening and a 90 per cent probability of not happening. If you did that, most of these options would expire because only 10 per cent of the time would you use them a But acquiring an option on a resource to bring into service provides you with more certainty letting you know that on date X you can ha plant Y, because you have gone through t process that will get you there if you need pl Y. It also tells you that you can cancel plant Y you do not need it.

The other way is to limit the percentage generation committed early. San Diego Gas a Electric has taken probably one of the mo extreme positions in the industry but it is t direction in which a number of utilities moving. It has said it will commit to only 50 p cent of its generation more than two or thr years in advance. It will make long lead ti commitments for 50 per cent; it will make sh lead time commitments for the other 50 unle something shows up that is really cheap override that. I am not suggesting that the 50- strategy is necessarily the right one but a move that direction is one of the ways that elect utilities have been moving.

Resource flexibility may have some increas in costs, like your insurance policy. You m build some units that are a little smaller, whi lose some small fraction of the economies scale, and you may have to pay some money f some of these options–they are not free–but still may be more reasonable than committing build plants with 13-year lead times.

1110

The other item is diversification. If we kne what the future was going to be, we would n want to diversify. For example, if you knew th everything in Ontario Hydro's base-case strateg was right, you would want to build, with t exception of a few really cheap demand manag ment and hydro projects, all nuclear if yo believed that there were a 100 per cent certain that it was right.

However, since there is not a 100 per ce certainty that Hydro is right and there a plausible scenarios under which that might not the least cost, you want to diversify. You want put some of your options out of the "What Ontario Hydro is all right?" portfolio. Yo might, for example, want to build some amou of gas-fired generation in any event.

If Hydro is right, you have peaking plants. Hydro is wrong, and somebody like the Minist of Energy's gas forecast is right, then you wi run the plants for a longer period of time and yo will save money. You will have essential reduced the risk in your plan.

iversification thus hedges against these rtainties. It also protects from the common-e-failure question that I was talking about. do not have all your eggs in one basket.

here are several resource options, which I t to call out briefly, that reduce risk. Demand agement and parallel generation both have t lead times. I also talked about some of the r aspects of parallel generation a couple of utes ago.

ut demand management has one other benefit people do not think about that often. It can ice the variation in your forecast. For nple, if your average new customer using tric heat uses 15,000 kilowatt-hours a year, if by demand management you cut that 000 in half, you have just cut in half the ation in your forecast caused by what you do know about how many new residential omers you are going to have. You can, ugh demand management, reduce the impact eing wrong in your demand forecast, which ices the risk.

he other one I want to talk about for a minute he configuration known as integrated coal ification combined cycle–IGCC–which is a ource you can start with a combustion turbine. s your cheap peaking plant; a scaled-up sion of a jet engine. It is cheap to build and ensive to run, but if you put in something that es some of the waste heat behind it, you have a nbined-cycle unit. It is much more efficient ause you have used quite a bit of the waste t coming out of the back end of this nbustion turbine engine. Then at some later ge it can be converted to coal through ification.

What you have is a whole strategy for xibility here. You can build it in pieces. You n start with the peaking unit and then you can nvert it, over time, to an intermediate unit ning gas. Then if gas prices go up, you can nvert it to coal. That is the same as saying, "I n have a gas plant, but I can have certainty that vill never pay more than $5 or $6 per million 'Us for gas because I can convert it to coal onomically if the price goes above that level."

What you have is something that is modular. It built in short lead times. It is built in pieces. It s an option of putting a ceiling on your fuel ices.

Hydro recognizes this resource. The problem in all of its planning, it just says, "We are ing to build it as an IGCC all at once. We are ing to build the turbine, the combined cycle d the coal gasification at once under all scenarios," rather than using it in this flexible way. In its planning, Hydro takes a flexible resource and make it less flexible.

Now we will take a look at Hydro's representative plans and some comments on them. What I am commenting on here are largely the questions of what uncertainties they did and did not consider in these representative plans. They had 16 scenarios. They did quite a bit of sensitivity analysis. They looked at sensitivity to three demand forecasts, whether or not you were going to get nuclear power, some variation in how much conservation is available and some very limited variation in fuel prices and the capital costs of various options. But they did not go far enough. They used three scenarios, but they assumed you knew which one you were on in 1992 and that you would stay on it. That is one of the cases where the world is not as convenient as a scenario.

Essentially, knowing you are going to be on a low-load-growth scenario for 20 years, right at the point when you have not committed to construct a nuclear plant so you can just write off $500 million and be done with it, is not the way the world works. They did not do any scenarios that, for example, look at what happens if we are in the middle of building nuclear unit A and, in 1997, demand goes into the basement. We are sitting here and the choice is either delay it, cancel it or have this huge amount of excess capacity on our hands. That was just not included in the scenarios. That is the WPPSS outcome.

Pacific Gas and Electric Co., in a long-term planning document that it just filed with the California Public Utilities Commission a week ago, said, "We have a real problem with this type of scenario basis." PG and E's analysis of load forecast uncertainty shows that stable, consistent trends as prevailed in the 1950s and 1960s are unlikely. It is much more likely that any trend arising in the near term will disappear or reverse in the long term. As a result, resource commitments will have to be made conservatively. High load growth cannot be matched with expanded resource commitments without risk that load growth will turn down in the long term and the new resources will not be fully utilized. They are thinking about the world in a little more complex way than Ontario Hydro is with respect to load growth.

The second issue is fuel prices. This is very important for a couple of reasons. First, it is important in determining what, if anything, is the cost advantage of nuclear over fossil. In a very high gas price scenario, your nuclear plant is

going to look better than in a lower one. It also is important because there is a feedback loop on the demand forecast in the residential and commercial space-heating sectors.

Ontario Hydro used a very high gas price forecast. I think it is in the order of $14.60 per million BTUs in the year 2000. This exceeds the Ministry of Energy's high case of its gas price forecast by 67 per cent. In fact, it is more than double the base case of the Ministry of Energy's gas price forecast.

What did they do in their sensitivity analysis? They said, "After the year 1995, let's check and see what happens if gas prices grow at half a per cent greater or less than our normal base case." The total difference in price is 7.7 per cent in the year 2010. They have a forecast that is twice the level of the ministry's and yet they are saying, "Our sensitivity case is it might be 7.7 per cent lower 20 years out."

They also compounded this problem by creating no plans which were structured to take advantage of any kind of low fuel price. They did not run a low-fuel-price scenario and they did not construct any plans that would look good under low fuel prices. They did not put in any gas-fired generation at all.

I am not a forecaster. I cannot tell you what oil prices are going to be in the next 20 years, but what I can tell you is that you have to run sensitivity analyses with reasonable high and low base cases for doing your oil and gas price forecasting and look at what happens there. Ontario Hydro took what I consider to be a plausible high case, ran it as their base case and did not run any sensitivity below it.

From the point of view of demand management, there was some sensitivity in their analysis, but it is possible that the potential for demand management may be quite a bit higher than what they estimated.

A study done for the state of Minnesota showed a long-term potential, over 20 years, for as much as 52 per cent savings through demand management. Not all of that 52 per cent will ever be realized, but if you are looking at that as the outside envelope of potential, you are also looking at the ability of programs to affect more of it than Ontario Hydro is looking at.

1120

Ontario Hydro also assumed that essentially it would cost 45 cents per kilowatt-hour conserved; that is, you take the cost of the program, divide it by the kilowatt-hours you get in one year and the answer is 45 cents. Some numbers that the California Energy Commission just developed in its recent biennial report showed numbers in t range of 10 to 40 cents per kilowatt-hour. Aga they may be on the high side of the cost demand management options. There is sensitivity to lower costs. There is also sensitivity in its decision to assume that dema management had only a five-year deprecial life–"It may last for 20 years but we are going write it off in five"–and that increases r impacts on ratepayers from the demand mana ment progress.

Parallel generation: Basically, I just want mention that they said some plans have 5 some plans have 1,200. There is a fairly arbitr pattern of availability of the resource, with in f more of it coming on line early when Onta Hydro says it does not need power and less o coming on late when it says it does need pow which is a little bit counterintuitive. I do not th there was adequate sensitivity done there. Th were also no sensitivity cases done to discount rate in the representative plans. Th was some in the standard costs, I will admit, not in the actual representative plans. T becomes important because a lot of what is go on in the representative plans are what they terminal effects–what is happening after the y 2010.

What is happening after the year 2010 is a more important if you are using a discount after the year 2010 of three and three quarters cent, which Hydro is using, than if you w using a number like six. We also have nucl plant costs and transmission and distribut costs, which I will discuss in a little more det Hydro's nuclear plant sensitivity was plus minus 10 per cent on capital cost. It used plu minus 10 on the capital cost of all options exc for the coal gasification option, where it use bigger number because of technological unc tainty.

The plus or minus 10 per cent numbers were a low-nuclear-cost scenario. They ran cap costs which, as far as I can calculate, are in range of $1,680 per kilowatt in 1987 dollars. capital cost of Darlington, calculated on the sa basis, is close to $2,500. Calculated us incremental heavy water rather than the full of heavy water, it is about $2,240.

The next slide shows some numbers which pulled together on the cost of Ontario Hyd generic units and on the Darlington units essentially the 1985 time frame when report was prepared and the 1987 time frame when representative plans were prepared. We see the cost of Darlington increased from ab

:00 to about $2,500 with all of your costs, from about $2,000 to $2,250 with incremen- eavy water. At the same time, its generic ear estimate, which was almost identical to ost of Darlington in 1985, went down 15 per from $2,000 to $1,680.

know that we are going to have a ministerial l spending a lot of time on nuclear cost, and I k that is a good idea, but what this raises to s a question of how to look at uncertainty. I ot think you have a reasonable base case n you have a future plant that costs less than you are building.

ssentially, the issue comes about because ro assumes that the cost overruns associated Darlington are specific to that plant and kely to recur. We are learning something; we going to do the next one better than the last we did, and nuclear costs will therefore fall. ontrary view to that is essentially the large plex project theory. This is material put ther by a very noted project manager named r Morris who works for Arthur D. Little and npany. He is a major academic expert on the ect and was brought in to testify for Pacific and Electric Co. in the Diablo Canyon rate : Why is Diablo Canyon prudent? It started costing $300 a kilowatt in 1966. That was the nate: It would cost $300 a kilowatt and come ine in 1972. It ended up costing $6 billion and e on line in 1985.

Ir. Morris was brought forward to say why is reasonable. Mr. Morris basically reached conclusion that with virtually all large, plex projects–nuclear plants, large public ks projects in the multibillion dollar range, elopment of new technology such as the ersonic transport, these items–you will have overruns and schedule delays if you have a e, complex project being built. It is not a ptom of poor management. It is just some- g that happens.

put three quotes down on this page. I am not g to read them to you, but they are saying nuclear plants are one of the worst examples large, complex project, that just by scale and pe they get expensive, and that virtually all of e projects have problems.

)ntario Hydro has also had some fairly serious t overruns. I have quoted the ones from kering B and Bruce B from the recent federal ise of Commons committee report on nuclear ver; Darlington has overruns.

o go back to the previous chart before the last , I will go from the capital cost back to the ital additions question. Hydro has not made any allowance for capital additions except for retubings. Capital additions are costs beyond operations and maintenance that must be spent on a nuclear plant to keep it running reliably. You have to keep adding more equipment to the plant over its life.

Hydro assumes one retubing 30 years out. Their existing units require retubing on a much more frequent basis. I understand there are some technical improvements which have been made, but it is still not clear that the one retubing 30 years out at a cost which is known in advance is necessarily a reasonable case for all analysis. Sensitivity analysis may be useful on that.

The other question is that they left out all the other capital additions besides this retubing.

Several firms in the United States, including Energy Systems Research Group and Komanoff Energy Associates, have major data bases on US nuclear plant costs, and these data bases show that the cost of capital additions has escalated in the United States at 13 per cent above inflation from 1970 to 1986, and is now at a rate of US$30 per kilowatt per year. I am not saying that is the experience with Ontario Hydro, but I am raising the question, again, as to the issue of sensitivity analysis. When you do not put anything in at all, it becomes a little unusual.

A similar issue relates to decommissioning. Ontario Hydro assumes you can decommission its plant at $209 a kilowatt. Nobody has ever decommissioned anything this big before. The largest one which has been decommissioned in North America is somewhere on the order of 40 megawatts.

One of the major witnesses on decommissio- ning costs estimates in the United States is a fellow by the name of Thomas LaGuardia, who is very well recognized in his field and is hired by the utilities. His estimates rose at 20 per cent per year from 1976 to 1986. This is the same expert looking at the same process getting more complicated over time.

The California Public Utilities Commission, faced with this information, adopted a 50 per cent contingency factor over the numbers that were put to it, which were in the range of $300 a kilowatt, and came up with C$443 a kilowatt as the cost of decommissioning a plant: more than double the numbers from Ontario Hydro.

The other issue where sensitivity needs to be done is the question of the capacity factor. Ontario Hydro assumes 80 per cent, including retubing. Historical experience in the last several years has been in the range of 70 per cent to 75 per cent.

1130

Shifting from probably one of the more controversial topics of our discussion to one of the slightly more mundane ones, I also took a look at the numbers for transmission and distribution costs in the representative plans. I did this because, from glancing at the page, it appeared to me that the results were a little bit unusual. I spent a little more time analysing them. I found that they assumed there was only a six per cent difference in the cost of transmission distribution between a case building all supply options and no demand management–and the supply options were central generating station nuclear units–and an all-demand-management case.

The six per cent difference was found despite 8,000 more megawatts of generation at a peak load that was 15 to 25 per cent higher in the all-nuclear supply case. This is, I would say, unusual in the extreme, contrary to the evidence that I put forward from Pacific Gas and Electric, contrary even to the material that Ontario Hydro puts in its own standard cost analysis where it assumes that some fraction on the order of 75 per cent or slightly less of transmission and distribution costs can be saved by demand management.

They also found that a case of distributed-supply resources would be cheaper than the all-demand case, which is a little unusual also, because you are adding some generating resources and your peak demand is higher but you still have fewer transmission requirements.

When I looked at their report on the transmission system, I found one interesting comment. It was assumed that the base transmission system would not be affected by the conservation measures. They assumed the answer and then they got the answer. Also from looking at the analyses, it appears that there were no local distribution system savings assumed for demand management.

Now, with the cost of transmission at $18 billion net present value in one of these plans, and a cost difference among the plans of something like $5 billion to $10 billion, I think transmission needs to be something people take a look at and spend a little more time with, because I think there is some sensitivity there where they may have made the demand management cases look a little worse relative to the supply cases in a rather obscure way.

This is my overview and summary from looking at their representative plans. We have not looked at the full range of sensitivity analysis for all of the items I have discussed. We have made a start, but we have only made a start, a is not a very large start. The difference in among the plans was a maximum of 10 to 1 cent. Quite a bit of that difference occurred i period after the year 2010, which is where w really out there and have no idea what is g on. It is also a very sensitive discount rate.

The margin of error in the plans, becau this lack of sensitivity analysis and some o assumptions that they put in their base c which I would characterize as unusual, is li to be greater than the difference in cost an plans. What that means is that the differe among plans may be too small to be the basi strategic principles and that whatever po makers do will not greatly increase costs unle essentially limits flexibility or hinders den management. I think the one thing that does s is that there really is an advantage for den management and it is likely to increase w some of this additional sensitivity analysi done.

What I am leaving you with is that we l gone through the process and reached the p where, because we did not take enough s back at the beginning, we may have to redo s of it.

I have prepared one very specific case stud show why we need to take a look at why differences among plans may be less than margin of error. I put together two scenarios the cost of nuclear generation and gas-f combined-cycle generation.

The first scenario used basically all of Hyd inputs–nuclear cost, the fuel prices and discount rate–and I compared the total energy costs of the two resources. Using Hyd assumptions, you find that nuclear costs 23 m per kilowatt-hour, 2.3 cents. Combined cy costs seven cents. As a result, combined cy was screened out in report 652 because of its h costs as not being something that one would w to add to the system.

I then put together what I call alterna scenarios. The only change I made to combined cycle was using the Ministry of Ene base-case gas forecast and using a six per c discount rate instead of four. The cost of combined cycle falls approximately 40 per ce from 70 mills to 42.

For the nuclear plant, what I plugged in w basically assumptions based on either Darling or other historical experience. I used the Darli ton cost numbers with incremental heavy wa adding in a little more for higher interest for six per cent discount rate and adding in a li

›re on top of that for additional bulk transmis-›n to integrate the nuclear plant into the system. I used a 70 per cent capacity factor instead of . I added a little bit of money to the commissioning costs for a higher contingency d I used a capital additions factor of C$25 per owatt.

I would characterize this as a reasonable ;h-cost scenario for nuclear. Capital cost goes ›m 13 to 33 mills. Operation, maintenance and ministration goes up a little bit because I anged the capacity factor. You end up with a sult that shows the two units are approximately uivalent in cost if my second scenario is rrect.

The purpose of this analysis was not to say that mbined cycle generation is cheaper than iclear. It was to say that there is a plausible case ith a probability greater than zero that it could ppen that combined cycle generation would be eaper than nuclear.

The lessons we have learned are that Hydro reened out the combined cycle based on mething equivalent to my first scenario. Under e plausible scenario, the two resources are proximately equal in cost and therefore, the al sensitivity analysis, not the plus or minus 10 r cents and the plus or minus 7.7 per cents, is itical to getting a reasonable answer out of your ›wer planning process.

The last topic I want to touch on is the question regulation. Ontario Hydro is fairly unusual in orth America for its lack of regulatory over-ght. Hydro Quebec is similar. But very few her utilities in North America have as much exibility as Ontario Hydro does to do what it ants in terms of planning and costs.

The Ontario Energy Board has some jurisdic-›n. They hold hearings on their annual rate ises. Hydro has rejected those recommenda-›ns on a number of occasions. There is not an tablished process for any regulatory body to cept, reject or modify any of Hydro's genera-›n plans, demand management programs or any the projects that come out of these generation ans, with the possible exception of some ansmission lines.

In the United States, long-term planning is sually under the jurisdiction of an independent gulatory agency. A study done in 1985–and the quirements have gotten more stringent since 985–showed that 38 US states required utilities file long-term resource plans with their state ommissions. Twenty-nine states have need-ssessment processes which match the need for ew generation with demand forecasts.

A number of states are moving in the direction of explicit least-cost planning hearings where they look at the development of plans that include demand management. I can think of Nevada, Connecticut and Massachusetts as specific examples in that regard.

To get to a planning process with unbiased regulation, we need the regulatory authority to have some teeth, to be able to approve, reject, modify and otherwise deal with a plan. That approval needs to come after an open public process. You let people into the agency. Public involvement by Ontario Hydro is useful, but it is no substitute for public involvement in front of a regulatory agency with some type of procedure that is fairly formal and evidentiary. You take evidence on what is reasonable to do and offer intervener compensation to bring in the public for reasonable submissions.

1140

You have a regular, periodic review. Something in the order of every two or three years is probably what most of the jurisdictions in the United States that have adopted this have. You cannot do it every year or you are never doing anything but planning, and if you let it go beyond three years, it starts getting stale.

You need a process that integrates how you get there from here, where the utility is essentially required to use consistent assumptions and the regulatory agency works with all of a number of areas–planning and the things that flow from the plan, plant siting, prices for parallel generation and overall policy for demand management–and where it has has some authority to look at the big picture.

You essentially use a common standard for evaluating alternatives, that is basically the long-run avoided-cost issue that I discussed a little bit earlier; and the regulatory body has as an adequate staff, not just to be reactive but to be somewhat proactive in conducting independent analysis and review of materials.

In terms of how one would think about choosing a regulatory body, you want ongoing continuity. You want permanent staff that can do reasonable amounts of work. The type of review we have seen in Ontario, ministerial review committees and select committees of the Legislature, which has been sort of the pattern over the last 10 years, is useful and helpful in getting some information together, but it is no substitute for having somebody who can actually say, "Come in here, bring me the plan and let me take a look at it very closely," and have some authority if he does not like it.

You need to have independent staff analysis done somewhere that could be done essentially at the regulatory agency or at another agency required to have input into the regulatory body. The agency needs the ability to conduct an evidentiary process so that we can bring things under scrutiny and cross-examination. The agency should have authority over a number of areas which all fit together in coming up with an electric power plan.

I think the Ontario Energy Board is a reasonable place to put this increased authority. It has an existing responsibility, albeit limited. It has existing expertise. There could be an argument for having the ministry staff doing some of the work presented to the board as independent analysis, but the Ontario Energy Board is the right place to vest this regulatory authority.

Summing up and coming back to the whole thing, there are six points I would like you folks to get out of this presentation today. The first is that Hydro has not adequately planned for uncertainty. This limits the usefulness of its results. They have started but they have not adequately considered all sources of uncertainty. The uncertainties not considered in the representative plans are likely to be greater than the differences among the plans. A better treatment of demand, together with formal analysis of fuel prices, nuclear and demand-management costs and the availability of parallel generation are among the most important uncertainties that must be incorporated into the planning process.

Second, there is considerable value to resource diversity as a response to uncertainty. In a system that generates 60 per cent of its energy from nuclear power, the cost advantages of nuclear energy need to be striking–and I am not sure that they are–to overcome the risk of dependence on one fuel and generating technology, particularly a technology with as long a lead time as nuclear energy.

Third, Ontario Hydro should not be allowed to plan based on a low discount rate in the range of four per cent. Its use of a low discount rate causes it to choose to build capital-intensive plants on the assumption that the faith in the credit of the province of Ontario is costless. Taxpayers and residents of Ontario are made poorer when Hydro plans resources based on the rate of inflation plus four per cent, when more profitable investments by small businesses and others are crowded out of the capital market.

Moreover, ratepayers with higher costs of credit would prefer to spend less money now to receive savings later than are justified by a f per cent discount rate.

Fourth, the California experience shows tha strong set of demand management standards buildings and appliances can cost-effectiv reduce energy consumption in Ontario. Onta Hydro and the province can and should do better than the weak standards which would o save 100 megawatts by the year 2000.

Fifth, a strong policy to encourage paral generation for prices based on full avoided c and reasonable standard contracts, with independent review of these estimates, is imp tant not only to bring resources on line but acquire the information Hydro needs.

Finally–and this recommendation flows fr everything else in this presentation–Onta Hydro is one of the few organizations in No America without ongoing regulation. An ind pendent regulatory body, operating through process of public evidentiary hearings wi intervener compensation, is required. A sing body should be given the authority to approv disapprove or modify plans, plant siting, parall generation, rate-making and possibly issues demand management such as building a appliance standards.

To conclude, I would say that if Ontario Hyd is confident that its analysis is reasonable, should welcome the opportunity to submit th analysis for regulatory scrutiny and bindi approval as part of a way of building consens for its future activities into the 1990s. appreciate the chance to have given this present tion to you folks.

Mr. Brown: I am particularly intrigued wi the comments about the discount rate and why is not appropriate and why it is. That seems to m to be one of the cruxes of the matter when we a talking about nuclear being so capital-intensiv vis-à-vis the others. This is a critical point to us.

My information is that Ontario Hydro roughly similar to most large power utilities i terms of its debt ratio. I cannot remember th numbers exactly, but I think the numbers w heard from Hydro were far different from the 1 per cent and 90 per cent you quoted.

Mr. Marcus: I think their numbers are ver similar to other utilities in Canada with th exception of the private utilities in Alberta wher you are looking at debt-equity ratios closer to 6 per cent debt and 40 per cent equity. You ar looking at a situation where the utilities i Canada typically have less equity because the have the guarantee of the provincial governmen and they can therefore get by with less equity.

Mr. Brown: On that line, seeing that the ›vince has the best credit rating possible–you ınot have a better credit rating than Ontario s–that would indicate to me that the province ı borrow money at the lowest interest rate ssible. I am wondering how you could do ter than that.

Mr. Marcus: One becomes an even better dit risk by borrowing less money. One finds it sier to maintain a triple A rating in times of onomic uncertainty if one is not borrowing ge sums of money for electric power genera- n.

Mr. Brown: Essentially, though, we have er the years always had the best credit rating ssible with the exception of a brief period ıere I think one of the companies chose to wngrade us very slightly. The four per cent ıtario Hydro is suggesting seems to be the ual number, the number that history is telling is correct in this last short period. I am not nvinced it is costing the province more.

Mr. Marcus: I would say the first thing is that four per cent number is not where we are lay. Today we are probably looking at a cost of ›ney to Ontario Hydro in the vicinity of 10.5 r cent with inflation running at about five per ıt, so today we would be looking at a real cost money in the vicinity of 5 per cent to 5.5 per ıt for Ontario Hydro. The four per cent they using is a longer-run projection. I would say en today you are looking at a higher real erest rate and you probably have looked at a gher real interest rate than four per cent for ›st of the decade of the 1980s due to conditions the financial market, even for the best credit ks.

50

Mr. Brown: I guess we can check that with ıtario Hydro to find out what the actual figures . Obviously, this is a great issue in the debate, cause some projects are far more capital- ensive than others, and that presumption in elf could be one of the largest variants. I guess ıt is what you are telling us, that the esumption here of what the real discount rate ll be is one of the critical factors in deciding ıat option actually is the most economical.

Mr. Marcus: I think that is one of the major ctors. I ran one case which took Hydro's cost d just changed nothing but the discount rate, d it had an effect of 15 per cent to 20 per cent on cost of nuclear generation. That is just as an ample. It had virtually no effect on the cost of combined-cycle generation, because weighing the future a little less heavily relative to the present offset the increase in capital cost.

Mrs. Sullivan: I wonder if you took into account in your analysis of the discount rate the fact that Hydro's debt is self-supporting and that the earnings are indeed adequate and the Ontario Energy Board insists that they are adequate to cover the debt requirement.

Mr. Marcus: Yes, I did, and the reason is that Hydro is able to get away with a much lower interest coverage ratio than utilities that do not have the guarantee. It is self-supporting, but it has an interest coverage ratio in the range of 1.1 to 1.2, whereas essentially a municipal utility in the United States without a government guarantee needs an interest coverage to maintain a rating even less than Ontario Hydro's, say double A, of 1.7 to 1.9. I did take into account that Ontario Hydro was self-supporting but that it did not have to maintain as high an interest coverage ratio as a utility which did not have the guarantee.

Mr. Brown: I have another question on another line. I do not think we have dealt with this specifically, but it is one of the things that has been brought up by other presenters, especially the municipal utilities, which are the distribution portion of our system. What I am hearing from them is they seem to be encouraging the use of electricity, because, for them, it makes sense. It spreads the costs over more customers and all that kind of thing, and they can upgrade their facilities, whereas Ontario Hydro, of course, faced with building new facilities, is making some effort towards the demand/supply.

What is the situation in other jurisdictions? Do you see some kind of conflict there? I see it here.

Mr. Marcus: It has definitely been an issue that has been raised in certain areas in the United States, where essentially, if you have a rate structure which has a demand charge based on the maximum number of kilowatts used and an energy charge based on kilowatt-hours, you can use more kilowatt-hours without raising the kilowatts. Your system becomes cheaper, and that is the type of rate the local distribution company is facing, whereas when you get the kilowatts and when you get the kilowatt-hours, it may be very different from Ontario Hydro in some cases. For example, Toronto is summer peaking, whereas the province as a whole is not.

This conflict is one that has come up in other places. It has a lot to do with questions of rate design and of how long you are looking out over time. If you are looking at your existing customers and your existing distribution system, you may want them to use more energy from the

point of view of spreading the cost of the distribution system. But if you are looking at attaching a new customer to the distribution system, you may want it to limit its energy use so you do not have to build as big a distribution system.

It is a complicated question. The incentives of the municipals are different to some extent from the incentives of Ontario Hydro, and that is caused by rate design and this distribution question.

Mr. Brown: Thank you.

Mr. Runciman: I was wondering how you would respond to an article that was in the Toronto Star just the other day: "Blackouts to Hit Ontario Next Decade MPPs Told." This was as a result of some groups appearing before us and indicating that they are quite concerned that Hydro has failed to recognize energy demands increasing rapidly and the dire need to build new generating stations as quickly as possible, not only to meet higher electricity demand, but also to cover shortages when older stations are mothballed. Do you have any reaction to that concern?

Mr. Marcus: I myself saw the article just this morning and spent about two minutes with it. In general, what you are looking at is you need to start doing something, and I think the something is to start doing some aggressive demand management and parallel generation programs, because there is some possibility demand will rise rapidly.

I am not sure that the numbers put forward by the major power consumers are necessarily correct in and of themselves, because they may not be taking enough of the conservation impacts into account, but they tell me you probably ought to start with your demand management and your parallel generation fairly rapidly, because of the possibility of a high load growth scenario. If in the event that high load growth materializes, the answer might well be to build some fossil stations early, so you have time to do something to keep the lights from going out.

Mr. Runciman: Okay. When we talked about debt with Hydro before, one of its arguments was debt-to-equity ratio, and you seem to be shooting a hole in that one.

The other one, of course, is a standard argument, which indeed you get at the municipal level as well, "We want to spread those costs over a 25- or 30-year period so that the people who are reaping the benefits from that investment somewhere down the road are also going to pay their fair share." How do you respond to that?

Mr. Marcus: I think that typical utilit rate-making does that, to some extent, b spreading cost. The question is, what costs hav you got and how do you spread them? Th standard method of rate-making will spread th cost of capital assets over time, regardless o what the debt-to-equity ratio is. I think there ar other, alternative rate-making methods that hav been proposed in the United States for doing that It is something that might be able to be done little bit better, but it is something that conven tional rate-making in fact does.

Mr. Runciman: Did you take a look at th proposal of resource smoothing as a strategi principle?

Mr. Marcus: Yes, I did.

Mr. Runciman: What did you think of it?

Mr. Marcus: In general, resource smoothin is something that I am not as confident about a Ontario Hydro is, because I think it is an attempt for example, to try to spread out nuclear statio generation over time, even though it may giv you some excess capacity at certain times.

It may actually add some inflexibility to you system. You know: "I have to build this plan even though I might not need it, so I can kee people working on nuclear power plants." would prefer to rely on shorter lead-tim resources to bring in plants over time and perha look at nuclear as being, if anything, the optio that you build for the increment of demand th you are most certain you are going to get. If yo low load forecast says you need something and you want to build a nuclear plant, maybe that the place to build it.

Mr. Runciman: I looked through your repor your submission today, which I think has bee the most interesting we have heard, by the wa When you were talking about the standard co technique being very unique, you mention things like the demand management, the fiv year depreciable life, etc. It conjures up son questions in respect to whether you have a vie that Hydro went into this whole exercise with preconceived notion about what it wanted achieve out of all of this and sort of designed t whole approach to come up with the result whi was indeed predetermined. Do you want to ma an observation on that?

1200

Mr. Marcus: I do not really want to impu motives. I would say that I saw one docume from Hydro which was prepared to lay out to employees the reason it was having this wh demand/supply planning strategy. That doc

ent had in the conclusion, inside the document, efore they had done the plan, the statement that ajor new generation would be needed between 996 and 2001. That is about as far as I am illing to take that one.

Mr. McGuigan: Before I was as busy as I am this job, I used to read business magazines. I emember a number of ads they had for diesel lectric units that you put out in the field nmanned, which automatically come on for eaking power. Has that become much of a eality? Is it very important?

Mr. Marcus: I will tell you that my friends at acific Gas and Electric Co. are scared to death f diesel engines for water pumping for farmers, ecause they have been raising the agricultural ates by double digit amounts over the last everal years because they say they do not reflect osts. The farmers are going out and putting in iesel engines and taking the top off the summer eak but also taking large amounts of revenue out f the utility's pocket. I have seen that happen.

Mr. McGuigan: That is substituting. Do they ave these diesel electric units on line that come n automatically or via signal for peaking power?

Mr. Marcus: I have not seen it in the gricultural sector, but I have seen–they use the tandby generators in hospitals that way in some tates in the US, where they will be able to send ou a signal to turn it on, say, up to a couple of undred hours a year. They will pay you its apital charge and they will pay your fuel costs or it.

Mr. McGuigan: I take it your answer, hough, is that they are not part of the utility's ystem.

Mr. Marcus: They are not part of the system out they are counted as a reduction to peak load because the utility can turn them on. They are a reduction in the demand that the utility sees. When they have that reduction, they plan for that as being available when they figure out what they need.

Mr. McGuigan: Your answer about the agricultural one brings me to a situation we have in southwestern Ontario where I live, down near the end of the peninsula of southwestern Ontario near Detroit, largely a grain-growing area. It is drier than the rest of Ontario and, as you know, we suffered a drought here as we did all over the grain belt of North America. The farmers there, in order to compete, because some of them were actually looking at a crop failure this year, are certainly looking at irrigation. Even in Alberta, the great grain-growing area, a lot of that is irrigation. Of course, California and the American southwest is irrigation. We are looking at irrigation as a method of survival but also as a method of competing.

We are very fortunate here in Ontario that we have gas storage caverns under Lambton county. It is rather unique in that you can buy gas from whatever source all summer long and store vast amounts of it there so that it is available for summer peaking. It would appear right now that rather than build new capacity lines–and we are building lines into southwestern Ontario right now; we are short of capacity–that this future demand, and I can see a future demand for irrigation, would be perhaps better met by gas, because we have the storage capacity and it is in the southwest.

Mr. Marcus: People are putting in gas-powered engines as well as diesel-fired engines to substitute for electricity if you are close enough to a gas main in California. A couple of the gas companies have been encouraging that. The ones which are not integrated with gas and electric in the same company have been encouraging gas-fired water pumping by providing lower summer gas rates than winter gas rates because of the system peak in the winter on the gas system.

Mr. McGuigan: One of the advantages of gas is that you can go to any junkyard and buy one of those big old gas hogs out of a 1970 Chrysler or Cadillac. They are large cars that run between 400 and 500 cubic inches.

You can buy those things for a pretty reasonable price and put them in operation for a pretty reasonable price. I just wanted to get it on the record as one of the things that may be an answer in Ontario. That fits in with what you have been telling us.

Mrs. Sullivan: One of the things that we have discussed with the technical advisory panel and with other interveners before the committee relates to when the strategy ceases to be a strategy and becomes a plan. I was interested in your comments relating to the representative plan.

I wonder if you would further comment in that area about whether some of the variables you have spoken about Hydro admitting–from the representative plans and the options, for example–would not more appropriately be defined at a later stage rather than at the strategic direction stage, to be entered into the process once the strategy is fully defined?

Mr. Marcus: I think the problem is that we have seen that the strategic directions, broad as they are, have flowed out of the representative

plans. Given that they were adopting that process, it means that the failure to do the sensitivity analysis renders many of the strategic principles, to the extent that they are not bland, suspect.

If you are in fact relying on the representative plans to get there, then the sensitivity analysis probably should have been done because you may be getting to a point, even at the strategic planning level, that you do not want to be at.

Mrs. Sullivan: Because you are cutting off options?

Mr. Marcus: Because you are cutting off options. Hydro has cut out gas-fired options in its report. They have also, again as I indicated, made some very specific statements in areas where they do not have a whole lot of information at the strategic planning stage on some of the demand management and parallel generation options. They have said, "We know what we want to do here." I am not sure that is warranted, given the information that they have.

Mrs. Grier: We have heard from an awful lot of people before this committee about the advantages of cogeneration, power level generation and the advantages it has for the system. There have to be some drawbacks.

What is the downside? The only one I can think about is that we then lose control to a large degree by having so much of our generation within the private sector. I can appreciate this with the advantages of a mixed system, but are there any drawbacks to it that you can identify?

Mr. Marcus: There are certain areas which I think really are the responsibility of the utility. A utility system has to meet load minute by minute. A mix of private power producers does not provide that glue that does that. That is why private power production, unless it is expanded into a very different concept than even people in the United States are thinking about, is never going to provide the glue.

Nuclear power plants also do not provide the glue because you do not load-follow them either. It is furnished by your load-following resources: coal, oil and gas units and energy storage technologies, if there are any. The utility has the job of integrating everything together and making it work in a reasonable manner.

1210

I think you can get into some drawbacks if you build a system that has too many base load resources, whatever they are, and you do not have a means of reflecting that in your price. I mean, that can be too many parallel generatc and it can also be too many nuclear power plant

Mrs. Grier: So you are calling for diversity all aspects.

Mr. Marcus: I think you have to have enou capability to run your system, which really is t utility's job here.

Mrs. Grier: You talked about the standar and you urged us to avoid consensus standar for appliances and efficiency, but I seem to rec somebody else we had, I think from the easte United States, making a plea to us that the on way to really get appropriate standards was discussion and consultation with the industr appliance manufacturers, everybody concerne How did California arrive at the standards that decided to impose?

Mr. Marcus: Essentially, it was in betwe the two processes. They had a body, t California Energy Commission, that was tol "You have authority to impose standards within certain range. You can't impose standards th aren't economic. You can't impose standar that will impede competition because only one two manufacturers can make them. But beyo that, you have the authority, after going throu an open, public process."

They went through a whole set of rule-makin hearings that took, in the beginning, a couple years, and they had quite a few arguments ov the standards in the early stages. After peop have seen them work for a while, the changes the standards that have been made over time ha become much less controversial.

I think you need a structured process. I do n think you say, "Legislature, enact standar today." I think you say, "Legislature, gi somebody the authority to enact standards und certain guidelines and after a certain process but you give somebody the authority to actual make a decision that is better than the lea common denominator of consensus.

Mrs. Grier: In your final section, where yo were talking about the nuclear costs, yo indicated that you had made an assumption an built in, I think, 10 per cent more for decommi sioning.

Mr. Marcus: I think it was 30.

Mrs. Grier: Maybe that was the wrong figur but I wonder how you arrived at any figure f decommissioning.

Mr. Marcus: I think arriving at figures f decommissioning is one of the black arts of co estimation of nuclear power plants. It is probab one of the things that is hardest to do

stimating the cost of a nuclear power plant. asically, what I was doing, for conservatism, to ome up with this number was raising it to about alfway between where Hydro is now and where iat California estimate I quoted was.

It came out adding 33 per cent, which was bout halfway between the two of them. It is a ery difficult thing to do. Nobody has ever done . It is going to be extremely technically complex) do, and people will figure out that there are roblems they never thought of when they show p and start doing it.

My overall thought on the subject is for a ood, healthy contingency factor for unforeseen ircumstances, and the same type of arguments I vas giving about large, complex projects on uilding nuclear plants go into the large, omplex project aspect of decommissioning iem.

Mrs. Grier: Thank you very much.

Mr. Cureatz: I am interested, just briefly, in ie decommissioning aspect also. You menoned in your presentation the $40-million ecommissioning process that took place some/here. Was I wrong on that?

Mr. Marcus: I think it was a 40-megawatt roject; at least I think it should be 40.

Mr. Cureatz: I am sorry. Whereabouts was ?

Mr. Marcus: Pennsylvania. It was quite xpensive, but it was also small. It was also one f the first ones, so I am not sure that is omething reasonable to base an estimate on ither. It was something like $1,300 or $1,400 a ilowatt.

Mr. Cureatz: Right. You suggest there hould be an overseeing body of Ontario Hydro, s I gathered from your presentation. You feel nore comfortable that such a body, in terms of vhatever its components–I am sure there will be ome cost involved to it however it is derived–vould possibly in both the short run and the long un save the people and consumers of Ontario ubstantial amounts of money in terms of giving irection to Ontario Hydro on the method in vhich it is expending its funds in regard to, say, onstruction of more nuclear plants. Is that sort f it in a nutshell?

Mr. Marcus: I would say there is both the uestion of saving money and there is the uestion of making sure that the other aspects of he public interest, however they are defined, are epresented. There may be some things that are lecided that may not save money but maybe the ublic wants done.

Mr. Cureatz: Have you ever put your mind to the process of what that body would take: appointees, some government people, some kind of panel, some academics?

Mr. Marcus: The types of bodies that are routinely used for this purpose in the United States, and by the way are also used in Alberta, have appointees from government but appointees with fixed terms who can only be removed for cause. You would have, say, a group of five people with a staggered six-year term; that would be typically what the body would look like. I think the Ontario Energy Board is structured in that way also.

It really depends on where you put the independent analysis component. I could see good arguments for putting it with the board staff and I could also see good arguments for putting it in the ministry but making the ministry required to show up in these board proceedings. Some states in the US do it each of those two ways.

Mr. Passmore: I cannot remember which committee member it was you were making this response to, but you suggested that we need to do something at this particular point in time. One of the questions that has come before the committee and that it is struggling with is: "Suppose we do a parallel generation and aggressive demand management scenario in the province. What if it doesn't happen?" In other words, what if you have a party and nobody comes? Is it then too late to build central plant?

Mr. Marcus: I do not think so. I think what happens is if, for example, you did something and found it was not working as well as possible, you would miss the chance to build a nuclear plant for the year 2001. You might well have to then backfill behind with fossil stations, if you decided that nuclear was what you wanted to build, and build the nuclear plant, say, three or four years later.

The fossil stations might be a little more expensive, but that is your insurance policy. They also might be a little less expensive because if demand fell again, you could cancel them with five years' notice, whereas a nuclear plant takes much more than five years to cancel. Assuming that nuclear is the economic choice, you might end up with a couple of extra fossil stations in the worst possible scenario.

Mr. Passmore: Let me flip the question around. Supposing you decide to have a party and everybody comes? We have heard figures that it would take between $2 billion and $6 billion in the capital markets in Ontario. Where is that money going to come from?

Mr. Marcus: In part, it is going to come from displacing some of Ontario Hydro's own forays into the capital market to build various projects of its own. I think there are other parts that–

Mrs. Sullivan: Could you explain that? Hydro is really in the debt market, not in equity.

Mr. Marcus: That is what I meant. It is essentially from the debt side of things.

If you are looking at parallel generation, for example–I am not saying that this is the only thing that will happen and that it will take all the capital–parallel generation brings some of its own capital with it because there are organizations that essentially may not be in the Ontario energy market at all which will show up with parallel generation and invest capital into that market from their own retained earnings or from equity offerings, or from debt offerings for that matter.

In demand management, if you start from the point of view of standards, there really is not that much capital required to turn out efficient refrigerators relative to inefficient ones. It may be one of the reasons you are looking at standards being one of the reasonable things to pursue first.

Where you get capital and demand management tends to be in industrial and commercial processes and in weatherization. I could easily see a role for Hydro in raising some of that capital. I could also see a role for something like interest buydowns as a means of encouraging the private sector to go find the capital somewhere else.

1220

Mr. Passmore: Have you got a copy, by any chance? You referred to this document in your testimony.

Mr. Marcus: Yes, I have one in my briefcase.

Mr. Passmore: I would like to ask you about a particular table or a particular figure, figure 2 in this document of the technical advisory panel.

Mr. Marcus: Okay. I have found it.

Mr. Passmore: The technical advisory panel, when it appeared before us, suggested it would be useful if Hydro itself would come up with some type of schematic which showed where it was and where it thought it was going, so we could get some kind of impression of how the power system planning process might evolve. Based on your analysis of DSPS–and I do not know whether you have really had much of a chance to look at this–can you give me some kind of indication of where you think DSPS puts us on this continuum?

Mr. Marcus: I think probably, if it had been done correctly, there would be another step somewhere–

Mr. Passmore: If what had been done correctly?

Mr. Marcus: We go through "Goals and objectives," "Analyse demand," "Analyse resources," and "Assess existing system." I think if the case of analysing resources had been done correctly with the appropriate levels of sensitivity analysis, you would then go down through and you would be somewhere just past the step where it says "Identify alternative plans." You would have identified them and learned something from them, but you would be somewhere just past that step and ready to go on into "Evaluate risk management strategies" and "Establish cost-effectiveness criteria."

But because the "Analyse resources" up at the top of the thing was deficient from the point of view of sensitivity and from the point of view of information collected, I think you have to go back and do some portions of it over again, from the planning perspective.

Mr. Passmore: If that is the case, what kind of window do you see, in terms of your review of DSPS and in terms of the urgency with which some witnesses have come before the committee and said there is a certain urgency to get on with doing something? What kind of window of opportunity do we have here for going back to the "Analyse resources" box?

Mr. Marcus: Just because you do not have a full plan does not mean you have not learned something from the process. I think one of the things you have learned from the process is that demand management is a worthwhile thing to do in relatively large amounts, probably relatively soon, given the potential expressed by some parties for high load growth. I would say you actually start implementing some of that material, where you have learned something from what you have done, while going back and rethinking the way through to an integrated plan of how to fit the whole system together.

Utilities have operated without plans for years. Some of them have operated better and some of them have operated worse, but sitting here without a plan, as long as you are not committing yourself to something that makes your system less flexible, I do not think is–I think we could live without a plan for another year or two as long as we do not, in the course of not having that plan, commit ourselves to something that limits flexibility.

Mr. Chairman: Are there any further ques-ons from the committee?

Mr. Marcus, thank you for coming in. I think our paper has been a very interesting one. It has iven us a good perspective on the DSPS and has rovided some good food for thought. I suspect he measure of the interest of your paper is indicated by the fact that most of the committee is still here, even though we are well into the lunch hour.

I thank you again for coming and I will adjourn the committee until 2 p.m.

The committee adjourned at 12:25 p.m.

AFTERNOON SITTING

The committee resumed at 2:08 p.m. in room 228.

Mr. Chairman: I call the afternoon session to order.

The first witness is Mr. Hayhurst from the Orillia Water, Light and Power Commission. Your presentation has just been handed out to the committee.

Mr. Hayhurst is the secretary and general manager of the Orillia Water, Light and Power Commission, which is a private producer of power in Orillia, I guess, and he is here to talk to us about some of the experiences they have had in producing power and selling it to Hydro. With that, Mr. Hayhurst, I turn the meeting over to you.

ORILLIA WATER, LIGHT AND POWER COMMISSION

Mr. Hayhurst: Mr. Chairman and members of the committee, I have already been introduced, so I will go on. I apologize. Why I came down with a bad throat yesterday, I do not know. That certainly was not very good timing on my part.

The Orillia Water, Light and Power Commission is a municipal electric utility. We are not private enterprise. We are a municipal utility supplying the electrical needs for the city of Orillia. We were incorporated as a commission in 1913 and we have been in the generation business for the entire life of the commission as well as being responsible for the distribution. Indeed, hydraulic generation in Orillia precedes the commission, a committee of council having developed our first power plant in the 1890s.

At this time, the commission operates three hydraulic generating stations known as Swift, Minden and Matthias. Incidentally, they are all outside of the municipal jurisdiction boundaries of the city of Orillia.

We have a total output of 14,500 kilowatts plus an additional 2,000 kilowatts of diesel generation, which is used solely for shedding of peak power purchase on a monthly basis. These units supply, on average, approximately 30 per cent of the needs for the city of Orillia at our present size.

For several years, we have looked at a number of sites to try to find an economic expansion to our generating capacity. In 1977, the commission engaged Shawinigan Engineering to do a complete feasibility and environmental study on seven sites on the Musquash River in the area of Go Home Lake. Two sites were selected, to be developed in tandem, which would provide an output of approximately 15,000 kilowatts at a capital cost of $18 million.

We spent $250,000 on this project and it proceeded as far as the commencement of the environmental assessment hearing in October 1981. The hearings were adjourned after one hour as a result of a lawyer representing the cottagers, who were opposed to the project, challenging the right of the Environmental Assessment Board to hear the application.

In May 1982 the commission held a meeting with the Premier, the Minister of Energy and the Minister of the Environment in an attempt to determine whether it was futile on the part of the commission to proceed with the project or whether there ever would be any possibility of something fruitful coming from our ventures. In that meeting, we were presented with a large number of red flags. These red flags made it very obvious that while the government at the time was paying a great deal of lipservice to its desire for additional hydraulic generation, it was not at all in fact prepared to support our need to overcome any of the catch-22 situations which existed and prevented a utility from creating hydraulic generation.

The cottagers had done extensive lobbying of their members of provincial parliament and especially members of cabinet. Their purpose was to ensure the cabinet would not give approval to the project regardless of the recommendation of the Environmental Assessment Board. They believed that hydraulic generation was environmentally harmful and that there is no need for additional electricity in Ontario.

In the Draft Demand/Supply Planning Strategy, Ontario Hydro has identified the need for development of small hydraulic sites by private enterprise and by municipal utilities. The project of which I just spoke is an example of the type of site which is now to be encouraged and be part of the supply of energy for the 21st century. Indeed, it is one of the best sites still available today in the southern-central part of the province.

The purpose of this presentation to you is to show our support for Ontario Hydro's plans for small hydraulic generation and to provide to the committee an insight into some of the difficulties municipal utilities encounter in such developments.

I would now like to draw your attention to ome specifics in the Municipal Act, subsection 41(1). As a municipal utility, we are not llowed to go into another municipality to carry ut any works, such as hydraulic generation evelopment without the passing of a private nember's bill granting us such permission. The eason for this legislation, of course, is to prevent ne municipality from entering into another and aking over works which are the responsibility of hat municipality itself. There are, however, very ew municipalities with the structure available to lo hydraulic generation. Therefore, it is a eedless restriction on those municipal utilities hat have such capabilities when it is recognized hat the project could proceed, either by Ontario Iydro or private enterprise, without this type of pproval.

In our project on the Musquash River, we vould have been constructing in the township of Georgian Bay. Cottage owners on Go Home ake, as well as cottage owners on Georgian Bay, raised objections with the council of the ownship, requesting that it not give permission o our construction. Without the approval of the ownship council, we were unable to get the bill passed, and it was on this point that the lawyer for the opposition challenged the right of the Environmental Assessment Board to hear our application. The Environmental Assessment Act, section 6, requires that it be the first approval received for a project. The Environmental Assessment Board has the right to hear applications only from individuals who have the legal right to proceed with the project at the time of the application. We then found ourselves in a catch-22 situation.

With regard to environmental assessment, the provincial Ministry of Energy and the Ministry of Natural Resources spent a considerable amount of money identifying and cataloguing sites in the province which have hydraulic generation potential. As a municipal utility, in order to develop any of these sites, it would be necessary for us to go to the expense of a full-scale environmental hearing. If the province has spent a lot of money identifying a site to be developed for hydraulic generation, what logic is there in requiring a municipal utility, or for that matter Ontario Hydro, to spend several thousand dollars in such a process?

Under existing legislation–the Power Corporation Act, section 96–rates charged by a utility are subject to the approval and control of Ontario Hydro. In this manner, utilities are limited in the amount of working capital which they can build up to help finance major projects. It has been our experience that it is necessary to have such funds available in order to stabilize rates and not create a severe negative impact on the consumers in the very early years of such a project, when the debt repayment costs are high and the benefits to the consumer are at their lowest point.

Financing of the project must be done by way of debentures sold by the municipal council. These debentures are for a maximum period of 20 years. Such debt, although totally liquidated by the sale of electricity, can be seen and often is seen as an onerous burden on a municipal council. This borrowing also is subject to the approval of the Ontario Municipal Board and thus adds another level of approval to the process before any work is done.

We have a job that needs to be done, Ontario Hydro has a job and so do you. In this instance, we all have one common responsibility, and that is to see that the customer is supplied with electricity at the lowest possible cost and with absolute reliability, for the development and security of this province.

I do not wish to suggest that for the sake of being able to proceed with a project, all rules and controls should be forgotten. It is absolutely essential that care be taken of our environment. Legislation must exist to ensure that the development of a project does not destroy it. However, it is equally important that the legislation promote the development of financially and environmentally sound projects. Quite simply, the evaluation process should determine the quality of the project and whether it proceeds or fails. The red tape of the process should never defeat any project.

As we look forward to the 21st century, we all realize the extreme importance to this province of the reliable supply of a renewable energy to ensure that we maintain and improve the quality of life for the people of this province and their position in Canada and the world. The Draft Demand/Supply Planning Strategy, by Ontario Hydro, identifies this type of supply as being, although not a large component, a very essential component in its plans.

As I had mentioned earlier, we have been in the generation business for many years and we have identified that by the operation of our plants we have been providing for Ontario Hydro a forum of load shedding for 90 years. We have been providing 16,500 kilowatts of capacity that Ontario Hydro has not had to provide within its system. We are able to provide that capacity on a local basis on a small scale at a fraction of the cost

of large projects. Yes, this has been good business for Orillia, but it has also been very beneficial to the province.

As our city grows, and as the province grows, we all must provide additional capacity in the generating facilities or face the consequences of taking this province a giant step backwards.

We ask you today that as part of your review of the Draft Demand/Supply Planning Strategy you include recommendations to review the legislation to ensure that catch-22 traps do not exist and guarantee that the legislation is the guide for development and not a roadblock. We just want to get on with the job.

Thank you. Are there any questions?

1420

Mrs. Grier: This is very interesting and I am sympathetic to the problem of the catch-22. Let me also assure you that I believe in the necessity of environmental assessments of such projects. I would be curious to know a bit more of the background of the one you identify. Did you own the land? Surely you would have to go to the township and make the community aware of your plans before you got to the environmental assessment stage.

Mr. Hayhurst: We had given them notice that we were looking at the site as to what we wanted to do. We did not own the property because we could not purchase the property without first having the private member's bill allowing us to own the land. Legal advice given to us said, "You cannot apply for the private member's bill until you have the environmental assessment hearing." So we went on that path first. Then, when we got into the environmental assessment hearing, the lawyer for the cottagers said, "No, you must go the other way." It was a case in which we had two doors, neither one of which we could open first but we had to open both first. It was very confusing.

Mrs. Grier: I understand. And presumably, if you had been not a municipal utility but a private company, you would have been able to buy the land and then make your application to the Environmental Assessment Board.

Mr. Hayhurst: That is correct.

Mrs. Grier: Let me just comment on your next section on the environmental assessment, because I certainly do not believe–and it is implied in your paragraph here on page 5 that you do–that Hydro, in identifying and cataloguing sites, has in fact paid a great deal of attention to environmental assessment.

Mr. Hayhurst: The government has iden fied and catalogued these sites for hydraul generation. It is a site that is recognized by t government as being suitable for this purpos namely, hydraulic generation. Hydraulic gener tion is hydraulic generation, period. It is not th you can do it in one manner and it is going to polluting and in another manner it is not. If a si is recognized as being an appropriate site for th purpose, it seems like double jeopardy to ask y to go through that whole process again. It do seem confusing in that regard.

Mrs. Grier: But would you not acknowled that in the process of identifying and catalogui the sites, the Ministry of Energy has not provid any opportunity for the public or the communi to have any input and to have their point of vie about the adequacy of the site made known? T purpose of the environmental assessment heari would be to canvass alternatives, to discu mitigation if in fact there were environment effects, and to hear from other interested partie

Mr. Hayhurst: Yes, you are quite corre One of the problems we found was that in tryi to prepare for the environmental assessme hearing at that time–and when we applied, were only the second application before t Environmental Assessment Act of 1975–the were not a lot of prepared guidelines availabl We worked very closely with the Ministry of t Environment in order to try to ensure that all of criteria, everything it wanted to look at, w addressed.

After the report was completed, it was se back to us identifying that there were a lot other areas which had not been addressed. Th were areas totally beyond what I would certain consider to be environmental, and that w financial. Environment was also deemed include the financial environment of people other areas.

That seemed to be a very difficult one to try address. If we are going to deal with assessment of the implication of a project to t environment in the immediate area and t environment overall, it seems hard to understa why we have to go into financial implications that area.

Mrs. Grier: Are you still interested in th site?

Mr. Hayhurst: Yes, we would be. We fi ourselves very frustrated in being able to proce because of the catch-22, but we would certain be interested. As I said, it is 15,000 kilowatts available capacity. It would be the closest site

ıt size that would be available to us in Orillia. ›s, I would still be interested.

There are also a number of private enterprise oups which would also be interested in that. hether we would be allowed to proceed simply our own or in conjunction with others creates me other legal problems as a municipal utility, t we would like to see that site developed.

Mr. McGuigan: I gathered from your com- ent that because of the efficiency of your stem, you have lower rates to your customers an would be the case if you were totally Ontario ydro.

Mr. Hayhurst: That is correct. At this time, e rates for Orillia are one of the lowest in the ovince of all of the municipal utilities. We have proximately 10,000 customers, and for any ilities of that size or larger, we certainly have e lowest rates in Ontario. Our hydraulic neration costs us approximately 40 cents on the ollar to produce as compared to what we can ıy from Ontario Hydro. That is as a result of a t of factors, not the least of which is the length time our power plants have been in existence.

Mr. McGuigan: So you blend the savings of our system into the rates.

Mr. Hayhurst: That is correct.

Mr. McGuigan: I think all of us see the oblem you mention as far as red tape is oncerned. I am just speculating that there may e reasons the government would not want to hange the fact that it keeps one municipality om owning property in another; waste manage- ent comes to mind probably as the first thing.

Mr. Hayhurst: I agree with that wholeheart- dly. In terms of waste management, one unicipality does not want another coming into s boundaries and that is very understandable. In ur case, if there were a site available in owntown Toronto to be developed, quite gically, I do not think it would be appropriate or Orillia to go into that jurisdiction and develop when there is a municipal utility in that urisdiction functioning which could do it.

When we are talking about, in this particular ase, the township of Georgian Bay, that area is upplied by the rural service of Ontario Hydro; here is no municipal utility there functioning. Ontario Hydro was approached before we looked t the site because it had the hydraulic generation levelopment rights for that site and had acquired hem back in the 1920s.

We approached them to find out whether they vould be interested in selling or relinquishing hose to us or wanted to hold them for their own development. They were quite anxious for us to proceed with that. Ontario Hydro did a great deal of work on our behalf and assisted us with the preparation of both the environmental and the feasibility studies on that. They were very much in favour. The area where the plants were to go was within their service jurisdiction.

I would not want to say we should have carte blanche rights to go into any other municipality, except where there is no other municipal utility in that area servicing it. I am not just saying we should have free rights just to walk in. I think you have to have some control and guidelines on that. But it does become frustrating when it is a case of "this must be first but that must be first" and they have the right to say no without any real logical reasoning.

1430

Mr. McGuigan: I guess the old saying is, going back to the previous government situation, you cannot fight city hall. It was clear in intention that they did not want this to go forward.

Mr. Hayhurst: I would not say necessarily that the government did not want it to go ahead. There is no question that the problem was with the cottagers in the area. There are approximately 400 cottages on Go Home Lake. The two plants we were looking to develop–one was upstream and one was downstream from Go Home Lake–were intended to be run-of-the-river plants with a stabilizing effect on the lake levels in Go Home Lake. The cottagers basically did not believe that would be the case and that we would be fluctuating the lake levels up and down by some three feet to five feet on a daily basis. That would not be in our interest, because you just cannot operate power plants in that fashion. They did extensive lobbying with cabinet members and with their own members.

Mr. McGuigan: I am just wondering, if you arranged that again–hopefully, you would not, but if you did–would you ever consider the people of a town forming a private company and doing it that way? I guess a lawyer would have to answer this, but say the city had a 49 per cent share of a private company, would it still be considered a private company? Perhaps that would be a way of overcoming that difficulty.

Mr. Hayhurst: Yes. I would be very interest- ed in looking at all of this. Out of the DSOS, Hydro is saying, "We have to look at small generation." There are a lot of sites available. We are saying: "This we believe in. We have believed in it for many years and we want to get

on with it." All we are saying is, let's be able to get on with it and let's do the job.

Mr. McGuigan: We will certainly take a look at your recommendations.

Mr. Brown: This is a new thing, to me anyway. Is it possible for municipal utilities to buy from private companies that are producing power the way Ontario Hydro does? Is that something the utility can do or does a company have to sell to Ontario Hydro?

Mr. Hayhurst: That would be subject to the approval of Ontario Hydro. In other words, if there were a private company generating power in an area and the location of it were adjacent to us, I cannot see Ontario Hydro saying, "No, you can't have it," if we had the facilities there to accept that generation and they did not, for example. On the other hand, if it were a long way away, I cannot see Ontario Hydro saying yes to it. It would be strictly subject to the approval of Ontario Hydro, as I understand it.

Mr. Brown: But the municipal utility can do that, provided Hydro approves buying from a private source?

Mr. Hayhurst: I do not know of any case where it has taken place, but I cannot see Ontario Hydro saying no if it would be a very logical thing to do.

Mr. Brown: One of the questions we have heard over and over again, is buyback rates where Ontario Hydro purchases–especially small hydro. There is a fixed rate for less than five megawatts, I believe, at five cents or whatever. I am not quite sure how to ask this, but would you be better off, for example, selling your power in Orillia to Ontario Hydro at five cents and buying their power back from them?

Mr. Hayhurst: No. What we are paying to them for power is more than what they would pay to us on the cogeneration.

Mr. Brown: What does your utility pay to Ontario Hydro to buy power from them?

Mr. Hayhurst: Our present costs are approximately $45 a megawatt-hour, that is, combined demand and energy at our present load factor, approximately $45 a megawatt-hour or 4.5 cents a kilowatt-hour.

Mr. Brown: I will get this straight. I am just trying to figure out the economics of the thing because this is somewhat similar to cogeneration scenarios where a company that is producing power actually can possibly lose money by getting into cogeneration and selling to Ontario Hydro. It is complicated. I am not sure I fully understand it, but I am trying to come to som grips with it.

Mr. Hayhurst: In our particular case, would not be advantageous for us to sell it t Hydro and then turn around and buy it back What I would look at in a case like that in remote site would be to exchange powe Whatever power we provided to them at point A we would receive from them an equivale amount in Orillia–an exchange of power.

Mr. Chairman: I wanted to ask you about th Power Corporation Act. In your presentation yo drew our attention to the fact that Hydro has t approve your rates; yet you are funded b debentures sold by your municipality, whic have to be over 20 years maximum, which th Ontario Municipal Board approves, obviously. am wondering what changes you want to see i the Power Corporation Act. Would you pref the rates be set by the energy board itself would you like to–

Mr. Hayhurst: No, I would not want to se that go in that direction at all. I would consid that a step backwards most significantly. How ever, what I am looking at there is that if we are t proceed with a project like this–as I say th rolling costs are quite high at the front end of th project but the value to the customer is really its lowest point in the first few years.

We found in looking at the project on th Musquash River that I spoke of, in order to b able to provide financing for it in the first coup of years, because it was not going to be econom in the first couple of years through debentu costs, we would have to have either a larg amount of working capital or reserve fun available to us or we would have to increase o rates at that time by approximately 17 per cent t our consumers.

That would roll back after approximately fiv years, but the customer would still be concerne and ask, "Why should I pay 17 per cent more fo my electricity today only to have somebod else–because perhaps it may not be me–get th savings five years from now and thereafter?" Th project has to be looked on as a long-ter project. All I am saying is that in the approval o our rates now, we are restricted in the amount o working capital. If there was the possibility o going ahead with a project, for which we woul be allowed to gradually build up sufficie additional working capital, that would avoid th very severe impact to the consumer.

1440

Everybody is going to benefit from it, and th is what I am looking at. I am not looking

changing the control method, but I am looking at some of the specifics of the controls. I would not want to see the control method changed because right at the present time it is functioning very well through the review process. I am not suggesting that change at all, but just some of the controls, to be able to recognize that if the utilities were going into a major project, they would be allowed over time to build up and hold reserve funds for that specific purpose. It has to be controlled, but that is what I am looking after.

Mr. Chairman: Do you have any number like 10 per cent reserve or something?

Mr. Hayhurst: A 10 or 15 per cent reserve of the capital cost of the project perhaps, something in that area.

Mr. Chairman: Does the fact that your debentures have to be for only 20 years present a problem? I believe Ontario Hydro can do them over 40.

Mr. Hayhurst: That is correct. That is one of the aspects of it because in our case we were having to pay back substantial chunks of capital in the first few years just when the payback on the project was not there. There is no question that the project paid for itself and returned those losses in the early years. It paid for itself in nine years, and by the time the debentures were paid in 20 years, we were in a very profitable position and able to be passing on lower rates to our consumers.

There is no question of that, but it is that front-end impact that is the concern. The 20 years is a concern. The other concern is the debenture debt on the municipality when you are looking at something like this. I am saying perhaps for major projects like this, if it was recognized, you could still, under control, become more imaginative in the financing.

Mr. Chairman: So you would like to be given 40 years or something like that?

Mr. Hayhurst: For that type of project. I sure would not want to recommend that all municipal utilities have the right to debenture everything that they wished over a period of 40 years. I do not want to suggest that, but for a project like this that has a useful life of 40, 50 or 60 years and beyond. As I say, our Swift plant has been supplying power to Orillia since 1915. There have been upgrades in the equipment there, but the basic plant is still functioning, so it is a very long term type of situation. It is the same with Ontario Hydro generating stations. They are very long term plants and to be able to borrow for a 40-year term as opposed to a 20-year term would be beneficial.

Mr. Chairman: You mentioned the fact that the debentures have to be in the name of the municipal council. Would you prefer to see that in the name of your utility? If so, would they sell in the name of your utility with a credit rating behind it?

Mr. Hayhurst: I would say yes, based on the assets that are available for the backing of the debentures.

Mr. Chairman: Do you not think that the credit of Orillia does not sort of come in to bear? Hydro uses the province's credit. I just wondered if your commission was sort of doing the same thing.

Mr. Hayhurst: I can perhaps be a little bit tongue in cheek and suggest that perhaps a municipality might not want to see it because there is no question that the value of our municipal assets is a great benefit to the municipality and its borrowing. It could perhaps be a little bit the other way, particularly in the case of our power plants. There are very valuable assets in the name of the municipality.

What I am getting at there is that recently our debenture debt for the city of Orillia has been seen in the public eye as becoming onerous. There is a small amount of debenture debt there that belongs to the Orillia Water, Light and Power Commission. Whenever the debenture debt is viewed, it is always viewed in total, including our debenture debt, although in actual fact that debenture debt which is part of ours does not have to be liquidated by municipal assessment. It is totally liquidated, principal and interest, by the sale of electricity.

Mr. Argue: We had a witness appear before the committee on Monday from Etobicoke Hydro, a Mr. Hastings, who made some comments. It follows the line of some of the questions the chairman was just asking. He gave the analogy of the municipal utilities being at the end of a short leash with Ontario Hydro. I would like your feedback on where you see the existing relationship between a utility such as yours and Ontario Hydro, and perhaps some suggestions on whether your utility would welcome some additional autonomy.

Mr. Hayhurst: When you say "on a short leash," we have to go to Ontario Hydro for approval of expenditures and for approval of capital, and it would be nice in some respects to have greater autonomy. However, we have had a very good working relationship with Ontario

Hydro, with the local area office and with the region. For example, we also utilize its research division. We recently did a concrete analysis of the structural integrity of our dams at Minden and Matthias. We used the research facilities of Ontario Hydro and paid for that accordingly. These were facilities that were very beneficial. We have a very good working relationship in that regard.

As far as new developments coming on at Orillia are concerned, we utilize the services of Ontario Hydro. I certainly welcome any addition or any strengthening of that. I would not say it is not needed. I certainly welcome that, but we already have quite extensive relationships in that regard, if that is the direction you are looking at.

Mr. Runciman: Mr. Argue's reference to Etobicoke Hydro brought a question to mind. We were discussing its attempts to market electricity. You were saying you have a very favourable cost to electricity consumers in your municipality. Do you make a very vigorous, conscious effort to increase market share, to have more people on stream, if you will, in Orillia?

Mr. Hayhurst: Yes, we do. We look at every subdivision coming on stream and attempt to market electricity in that regard, because we do have very favourable rates.

The other aspect of electricity in Orillia is that we have three large foundries which establish about 22 per cent of our peak demand on a monthly basis, so it is very important to us to try to market electricity to fill up the valleys established by these foundries. We do so very aggressively. We have a very high percentage of residential and commercial space heating in Orillia. On every major project proposed for Orillia, we deal with Ontario Hydro to run it through its computer programs to determine the most economic means of heating and supplying energy for that building. In some cases, it is not necessarily electric. We have recognized that and we do that very extensively in conjunction with Hydro.

1450

Mr. Runciman: The gas and oil companies are surviving in Orillia despite the rates?

Mr. Hayhurst: Oh yes.

Mr. Runciman: I am just curious. When you mentioned filling up the valleys, can you not, rather than trying to push that, if you will–and you may not like the term–increase usage within your own community, get rid of that or fill those valleys by selling that electricity to Ontario Hydro?

Mr. Hayhurst: At the present time w generate enough power to supply about 30 pe cent of the needs of Orillia. We buy 70 per cent We are buying electricity from Ontario Hydro 2 hours a day.

We do not have sufficient water flow at th plants. Particularly this year, with its being very dry summer, there has not been sufficien power to be able to operate the plants at 100 pe cent efficiency, certainly on a year-round basis We therefore want our plants to shed the loa from Ontario Hydro.

As I said in there, the value of our plants reall is in shedding that load, minimizing the amoun of peak that we have to buy from Ontario Hydro That is the real value to us. That is the value t Ontario Hydro, as well, because that is peal power capacity that it does not have to sell. W are shedding it for them.

Instead of shifting the load into the valley, w are providing hydraulic generation at those peal times. If the water is available to us, we will ru in the valleys as well and take the energy out of it But the number one prime concern is to shed th maximum peak.

Mr. Runciman: I guess I am having a lot o trouble getting my head around that. I know with the peak at 6 p.m. or noon, you are trying t have maximum production at that period of time.

Mr. Hayhurst: Yes.

Mr. Runciman: I guess I am having troubl understanding why you have to sell mor electricity to fill in those valleys. Maybe ou consultant could spend time with me afterwards so I can get my head around that one. I just have lot of difficulty. I am sure there are others wh have problems with that as well.

I guess the whole concept we are talking abou is trying to conserve energy. You are sort o going on the other side of that coin. You ar trying to push consumption, to increase con sumption in your own community. Obviousl you have in your own mind a very valid reaso for doing so, but I guess I am having difficult with it.

Mr. Hayhurst: I think we all should b looking at utilizing the energy that is going to b the most efficient for this province. In thi particular case, we believe that electricity is th most efficient and the best for this province.

If we are not all out there pushing for the sal of electricity, then we are badly missing the coi on this issue. We are very badly missing the coin We are then taking very deliberate attempts t shove jobs outside of this province if we are no out there aggressively trying to sell to th

tomer the best possible and the most efficient rgy possible.

I am not saying, "Just sell electricity for the e of selling electricity." That is not what I am ing. I am saying: "Get out there and market it he most efficient manner. Make sure that you selling in the most efficient manner."

Mrs. Sullivan: This is, to a certain extent, a low-up to Mr. Runciman's questions. I just nder if your utility is involved in demand nagement programs and whether you are rking on conservation strategies in your own a.

Mr. Hayhurst: We have done a considerable ount of conservation work with the industries conjunction with Ontario Hydro, yes.

Mrs. Sullivan: Are you finding them to be ective? What is your takeup like?

Mr. Hayhurst: Where the customer can shift ne of his peak to some of the valleys ictionally, then that is taking place and has en place.

As I said, we have three large foundries in illia that establish 22 per cent of our peak. We ve been working with them, and so has the inistry of Energy and Ontario Hydro, to look at ir operations to make them more efficient. ere has been a considerable amount of work ne in that area.

Mr. Chairman: Are there any further ques- ns? Mr. Hayhurst, I would like to thank you on half of the committee for coming today and eaking with us and for giving us the benefit of ur experience in generating power in Ontario.

Mr. Hayhurst: Thank you very much for the portunity to be here. I certainly hope I have en able to provide you with some useful formation.

Mr. Chairman: Our next witness is Nirabro dustries. Come forward, Mr. Richardson. irabro Industries is here to speak to us about, if I iderstand it correctly, some new technology lating to hydraulic generation and some of the oblems surrounding that. Mr. Richardson, I ill ask you to explain a bit about your company id turn the floor over to you.

NIRABRO INDUSTRIES

Mr. Richardson: Nirabro Industries is a mpany formed, in part, to investigate new eas–

Mr. Cureatz: Excuse me, Mr. Chairman. an we shut off some lights?

Mr. Chairman: Certainly. Maybe we can nserve some power.

Mr. Richardson: First of all, I would like to thank you, honourable members, for allowing me to present an overview of recent developments on a totally new means of power generation. What I am going to talk to you about today is a way of combining two technologies, a natural gas technology and a hydraulic technology, to produce something that is more than just the sum of the two parts. It is something that has never been attempted before.

Nirabro Industries was founded to investigate new technological ideas and, about a year and a half ago, picked up an interest in a company which I was involved in called Saugeen Power Co. Saugeen's interest was developing small hydro projects and this technology had grown out of some research we did earlier with Saugeen Power.

1500

First of all, I would like to review the four principal areas of generation that are available in Ontario right now; namely, nuclear, fossil-fired coal, hydraulic and oil and gas.

Hydraulic power, as we have read in the Ontario Hydro study, suffers from limited availability of suitable sites or sites without environmental constraints on flooding or other aspects of the sites. Fossil-fired coal generation generates unacceptable levels of emissions and is exposed to possible shortages of fuel in the longer term. Oil- and gas-fired generation are limited by the cost of the fuel and possible supply considerations in the long term; while nuclear sites continue to meet resistance in the selection of new sites and there are ongoing concerns about fuel disposal and plant safety.

One of the main areas of future concern in the report seems to be in the area of meeting peak requirements, which can be 1.5 times the base-load requirements for power. Hydraulic and gas-fired turbines are currently the only real alternatives to meet the rapidly varying electrical loads or peak loads. This presentation I am making today intends to discuss a possible long-term solution to the peak load generation problem and possibly solving some of the other problems associated with the other technologies.

The project I am going to talk about is something called the new power project, and for the past two years, Nirabro has been gradually proving the viability of this new power generation technology. As I have said, the technology combines two previously well-known technologies to produce a hybrid technology never before attempted. The first of the two technologies is hydraulic air compression. Hydraulic air com-

pression is a means of converting water power into high-pressure compressed air stored underground.

Hydraulic air compression was invented by a Canadian, Charles Taylor, in the late 1880s and was the method of choice for producing the large quantities of compressed air required for mining camps and industry at the turn of the century. There were 21 major air-compression plants constructed around the world by Mr.Taylor's company between 1880 and the start of the First World War. These are slides of some of the many different sites that were built, and I will come back to them in a minute.

Hydraulic air compression involves digging a series of tunnels in hardrock or bedrock and taking a river, seen here in the upper left, and bringing it into a set of intake heads, which are designed to create vortexes in the same way that your bathtub creates a vortex, and the vortex sucks down large amounts of air.

The air is then taken down through a shaft 350 feet underground, where the water turns and runs along a long cavern, where the air bubbles back up to the surface and is stored as a big bubble of air in the roof of that cavern. The water then comes back up into the river downstream–you can see the difference in elevation between the intake and outlet–and it is now free of air and returns back to the river. This is going to be kind of hard, because there are some things I want to point to but I do not think I can reach, but I will try to describe them.

The top pipe is the main air draw from the cavern, and the way this plant works is very, very simple. Water comes in and brings the air down with it. It is coming in here. The air/water mixture comes down that shaft, and then it is directed into the cavern. The water flows out by itself, the air bubbles to the top and it is stored in the bottom cavern. The compression of that air is totally a function of the height of water in the outlet column. Just the same way a diver who is 300 feet underwater would be at 125 pounds pressure, that air is also held at 125 pounds pressure, so it is absolutely as simple as you could want.

The second pipe, at the bottom, is a safety blow-off valve, and that is designed so that as the air bubble collects in the top here, it pushes the water down and at some point it will uncover the end of this pipe, allowing the air to escape up the pipe forming a large geyser.

At the turn of the century, this was really the only way you could produce compressed air. You did not have gasoline-driven compressors or anything else, so this was it. They were built over Canada. There were seven of them built Canada. One of the most notable ones was in t Peterborough lift locks where it was used inflate the seals until about 10 years ago when was shut down.

This is the plant at Ragged Chute. You can s the four big intake gates where the water com into the plant. This is a side view of the plar Those intake gates are at the right-hand side the picture. Then the concrete structure to the le here is where the intake heads are located. T intake heads are what actually produce t vortexes.

This is a view of those intake heads. There a 144 pipes arranged in two separate funnels whi lead into two separate shafts going 350 fe underground. This was all built in 1909 over period of less than one year. This is a side view those intake heads. You can see a man standi to the left of them, which gives you an idea scale. They are about seven feet, six inches t and each pipe is 14 inches in diameter.

This is a view of some auxiliary ports belo the pipes that let extra water into the syster Below those pipes, the water and air mixture directed into these funnels and then down t steel line shafts 350 feet into the undergrou cavern.

The water goes through the undergrou cavern, which I cannot show you, and returns the surface in this shaft, coming up 300 feet ir 20-foot-diameter shaft and returning into t Montreal River. The main pipeline that you s rising up the rock wall is the air supply pipeli which used to supply air to the town of Cob and the whole mining camp. It was feeding network of 115 miles of pipeline serving at o time upwards of 90 mines.

The edge of the pipe that you can see he behind the snow is the safety blow-off pipe. Y can see it just barely comes above the surface the water. This is where the geyser will produced when the plant is operating and acts a safety relief valve so that the plant cannot ev get into any unstable conditions.

This is a view of the intakes in operation wanted to bring this because you can see a lit bit the turbulence and the vortexes forming, b that is over one of those heads with the wat rushing down the intake heads.

This is a view of the geyser which runs abo 350 to 400 feet in the air when the plant operating. That will run as long as the plant producing air and you are not consuming it. Th is the safety blow-off valve.

Mr. Charlton: These are the guys that were apped down there?

Mr. Richardson: These are the guys we sent own there.

The compressors ran successfully for the lives f the mines they supplied. They were aintenance–free because, after all, all they are a hole in the rock with a number of steel pipes reating vortexes entraining air in the water. As a chnology they were only abandoned when asoline- and diesel-powered compressors made e capital costs involved with building these lants at that time unattractive.

The largest hydraulic air compressor in the orld was constructed here in Ontario at Ragged hute near Cobalt in 1909, as I was saying. It applied the Cobalt silver mining area with air om 1910 to 1981 without interruption or major epair.

In the 1940s Hydro assumed control of Ragged hute. In 1981 the plant was superficially amaged and Hydro decided that the plant was oo costly to repair or operate. The plant was then hut down essentially for good. The plant was apable of producing about seven megawatts of ompressed air at peak flows.

510

The reason I put this picture in here is that hen we first started looking at the technology, it ppeared that recreating a hydraulic air compresor was going to be very expensive, to do all the ining, to create the shafts. To put another one f these plants into operation looked prohibitive. But after a lot of discussions with the mining ontractors in the north, we found that this type f mining that I am showing you here on the creen, shaft sinking, had been developed to a ine art to go after the very low-value base metal res that are present in areas like the Kidd Creek eposit in Timmins and the Sudbury nickel eposits, where the value of the rock per tonne is ery low. They developed methods that were ery cost-effective and also very quick. Since rom the time you start mining until the time you tart processing ore is a very big cost to you, you ry to keep that as short as possible.

We looked at shaft sinking, we looked at the nining operations now being used in development work–here we show a large claw working nderground to remove large quantities of re–and we looked at the boring technology to reate large numbers of shafts when you already ad an underground working started. We found hat Canadian mining technology could produce n underground working for a new hydraulic compressor at an unbelievably low capital cost and in an unbelievably short period of time.

At this point, it was clear to us that hydraulic compression could successfully convert large amounts of water power to compressed air stored underground. The next question was, how could this energy be best converted to electricity? Gas turbines seemed to offer the best solution to the problem.

Now, I am going to show you a bit about gas turbines. In jet aircraft or in industrial gas turbines, they take in normal air, compress it and then mix it with a fuel, either kerosene in the case of jet engines or natural gas in the case of industrial gas turbines, burn it and then run that through power turbines to produce shaft power to run either the propellers on a turbo-prop airplane or the generator in a gas turbine plant.

This is a picture of a normal compressor, where you are taking in air at, let's say, 60 degrees Fahrenheit. You compress it. It then heats up, because of all the work you have done on it to compress it, to about 650 degrees, and now it is at 125 pounds per square inch pressure. You then mix it with a fuel in here and burn it and raise its temperature up to about 1,600 degrees, still at 125 pounds pressure. Then you run it through three sets of propellers or power turbines. The power from those power turbines runs back through the shaft, through the compressor and out to the generator or the propeller.

In the case of a standard gas turbine, all the power from the first and second stages is used to drive the compressor, because the compressor is very inefficient. What we looked at was, what would happen if we could supply our cold compressed air to a modified gas turbine? This is what we found. If we put in 60-degree air, already at 125 pounds per square inch, and took it through into the combustion chambers, mixed it with a fuel and turned it into a hot gas, it would come up to 1,600 degrees. We could run it through the power turbines. It would still come out at roughly the same temperature, 830 degrees, as in the standard turbine, but we now had all the power from all three power turbines available to drive the generator. So we had a much cheaper machine, per unit of power output, by a factor of almost three.

We also found that if we took this hot exhaust and ran it back through a heat exchanger, we could take all the heat in the exhaust and transfer it to the cold gas coming up from underground, thus cooling the exhaust down to about 200 degrees so that we have no thermal pollution from the plant, and raising the temperature of the

gas coming from underground to 715 degrees. That temperature change, which we got totally from the waste heat, is now fuel that we do not have to burn in the combustion chambers. That was a tremendous fuel saving to this machine.

What we found, in summary, was that we could take a machine that was originally designed for 3.1 megawatts, or 3,100 kilowatts, and increase its power to 8.6 megawatts, or 8,600 kilowatts, and we could reduce its fuel consumption from 12,000 BTUs per kilowatt-hour to 4,000 BTUs. We have tremendous fuel savings, we have cut out the thermal pollution and, at the same time, we have almost tripled the power output for the given physical piece of machinery.

In a gas turbine the principal cost is the compressor. We have also eliminated the compressor and replaced it by a very cheap heat exchanger, so that the whole capital cost equation works out very well. The modified machine is actually less money than the original lower-powered machine. I am going to show you a bit of what is inside the new power engine. You saw in the previous engine the compressor and the combustors and power turbines. In a new power engine, all you have is the three power turbines and the combustor. The combustor is right here and the three stages of the power turbine and then the exhaust.

When you put it into a total plant, what would have been a plant with a normal industrial gas turbine, with the turbine taking up all the pink area and the generator taking up the orange area with a little gearbox in between in green, you now have a plant that looks like this, with the turbine in pink there, the generator in orange, the gearbox in green and the heat recovery unit up at the top in blue. You can see the relative sizes. We have really cut down the size, and obviously the capital cost, of that turbine.

In a new power plant, it is very important to understand where the power comes from, because the first reaction is that you cannot get more power from a hydro site than there is there. In fact, we are not. We get 33 per cent of our power from water power, 33 per cent of our power from natural gas and 33 per cent of our power from recovered waste heat. Together, that produces the total power output of a new power plant.

It is also important to remember that gas turbines are probably one of the most fuel-versatile machines available. They can burn natural gas; they can burn propane; they can burn waste gases like hydrogen, butane or any of the industrial byproduct gases; they can burn coal. They can be used in indirect firing with other fuels, such as wood, with a transfer media. Really, they are very versatile machines and you can use any one of a number of different fuels in them. To burn the different fuels, in most cases all you have to do is change the design of the combustion chambers.

We have done a lot of research on new power. It all sounded great in theory, but what we found when we started to talk to investors was that there has been nothing new in the field of hydraulic generation since late in the 1920s, so we had to research and actually prove the technology. Everybody asked us, "If this is such a good idea, how come no one has used it before?" which is the obvious question. That is quite easy to understand when you know that hydraulic air compressors disappeared from all the engineering texts and the engineering eye in the early 1920s when they were replaced by internal-combustion-engine-driven compressors. Gas turbines did not arrive until after the Second World War, and these two promising partners had missed each other by over 30 years.

In early 1986, our company committed $150,000 to researching the concept and building a working scale model of a hydraulic air compressor. The Ontario Ministry of Energy also provided funding to assist in the research effort. A scale model was built and used to test various aspects of the air compressor. This test work revealed the answers to several previously puzzling aspects of hydraulic air compression. Several volumes of material were gathered on everything from old hydraulic air compressors to the most modern gas turbines. After a year of research, the technology appeared very viable.

1520

We then needed to find a gas turbine manufacturer that could modify a gas turbine to meet our needs. We contacted all the Canadian manufacturers of turbines and were told that they either were not interested or could not supply the type of engine we needed. We then turned to Jo[illegible] Zanyk, the gas turbine power specialist for Dow Chemical worldwide. Mr. Zanyk became very excited by the technology's promise and offered to help. He managed to convince a major US manufacturer, Solar Turbines, to listen to our presentation. Solar decided to invest $300,000 to study the design of a modified engine for new power. They assigned their director of research, then John Eberhardt, to the project.

At Solar, they have been designing turbines across a wide range of sizes, and we found tha[illegible]

e largest production size was a turbine called e Centaur. This was essentially a production ne turbine that was being turned out several nits per month. In order to develop the turbine, ey had to test the individual power turbine ages and combustors by themselves. They ssentially had all the pieces there to be able to st exactly what we wanted. They assembled it, sted it on computer, then tested it in fact and roved that yes, indeed, if we had the volumes of r required, we could get the power outputs and e low fuel consumptions that we had predicted.

Solar's studies showed that our theoretical alculations of the economics, power output and el consumption for a new power plant were xactly correct. Solar Turbines became a strong upporter of the technology and showed strong terest in coventuring any future major plants.

At this point, we felt that we only needed to rove that the old hydraulic air compression chnology worked as well as the original ocuments stated. It was decided to commit a rther $600,000 to testing a full-scale working lant and the Ontario Ministry of Energy agreed fund half of this cost.

To prove the hydraulic air compression rinciple, we had to negotiate with Ontario lydro to obtain the rights to test the Ragged 'hute plant. We arranged with Acres to design, upervise and authenticate tests at the site. In Jovember 1987, we were allowed to test at the ite and, in the last two weeks of November and e first weeks of December 1987, we complete- y repaired and renovated the Ragged Chute lant. The plant went back into full power peration at the end of the first week of December.

I will just take you back. This is when we rrived at the site, showing the site with its riginal control structures over the heads and our rane trucks moving up to start removing the old re-damaged material. This is two days later, hen our major crane arrived and started to set up n the left. This is about a week later, once all the teel structure over the intake heads was replaced nd brand-new hydraulic cylinders to control the lant were installed. This shows repairs being nade to the pipeline where it used to leave to go o Cobalt. We had to cut that pipeline and allow it o blow to atmosphere so that we could put the otal plant production straight to atmosphere for he tests.

Over the next several months, we collected nountains of data on hydraulic air compression ests. Computer systems were used to collect and nalyse the data at the site and even remote-controlled submarines with video cameras were used to study the condition of the underground workings. These are some shots of some of the computer data acquisition. The environment was very harsh up there. It is very cold and it was quite a job to instrument. This is a shot of the underwater, remote-controlled submarine and the dive crew who came in from Can-Dive Services in Vancouver to examine all the underground.

We had expected to find the underground deteriorated or collapsed, since it had been constructed with no form of ground support or cable bolting, just blasted into the rock with no concrete lining, nothing special. When the cameras went down, they found that all the original steel work in the shaft liners was intact. There was very little corrosion. All the edges of the flare cones that turned the water into the main cavern were intact, showing no signs of corrosion. The main pipeline end and the main blow-off end were all in perfect condition and there were no signs of rockfall or groundfall at all. The most remarkable thing was that there was no silt in the system. The floor of the cavern was essentially bare of silt. It was as though it had been mined yesterday and flooded. We had expected to find four or five feet of silt on the bottom.

Tests are still going on at the plant and the data are being gradually analysed to study possible improvements in air compression efficiencies. Current analysis of experimental results confirms the turn-of-the-century work on hydraulic air compressors and shows they can economically produce large quantities of clean, high-pressure air safely and effectively in all Ontario weather conditions. We ran the plant down to about 40 below and it showed no signs of freezing or frazzle ice formation.

In summary, new power could produce twice the power output of any given hydraulic site. It could be constructed in less than half the time required for an equivalent hydraulic power plant. The new power plant has a typical capital cost less than half of a comparable hydraulic plant. New power plants do not typically require long planning and approval lead times. They use stock, off-the-shelf components.

New power plants burn less than one third of the natural gas required to power any other comparable gas-fired peaking plant because of the contribution of water power and waste heat recovery.

New power plants do not use high-cost, speciality technologies as nuclear plants do; so

the economic impact of the plant construction is passed on to the miners, construction workers and linesmen who build the plant as opposed to the large capital cost of new nuclear machinery.

New power plants have significant environmental benefits including no ponding required for peak storage since they store their peak power as compressed air out of sight, underground and, typically, much smaller civil works allowing easy fish passage. Because of the long underground caverns that we use for air storage, we can bypass rapids as opposed to creating a big dam at the bottom of the rapids and flooding back up the rapids to establish the head.

The plants produce water saturated with oxygen, producing ideal conditions for fish downstream from the plant. As the air comes down with the water, a certain amount of the air dissolves in the water and oxygen happens to dissolve preferentially to nitrogen; so we actually enrich and supersaturate the water at the outlet.

Because of the design of the gas turbines used in the new power plant, there is no thermal pollution. Our exhaust temperature is under 200 degrees Fahrenheit and the total nitrogen gas emission from the plant is less than 25 parts per million, which allows one to operate these plants without scrubbers in most major US cities. There are only a few cities which require any kind of pollution correction, and the pollution correction for these plants, if required, is very, very cheap since the amounts of material to be removed are so small.

I would like to talk a little bit about a project we are looking at, the first commercial project using new power, and then about two possible other developments which might be studied using new power. We currently hold the rights to develop a site north of Cochrane called Long Sault. You will find reference to Long Sault on page 27 of the supplement to the Ontario Hydro DSPS. Here it is referred to as a 52-megawatt plant with an average installed capacity of 26.9 megawatts. It is a future plant; there is currently nothing built at the site.

If we are allowed to go ahead with our plant on the site, we will produce over 50 megawatts of average power and over 120 megawatts of peak power without the flooding that would be involved since we would build our dam at the top of the rapids, as opposed to beyond the bottom of the rapids, which would create the large ponds involved in the Hydro proposal. We would be able to build it at much lower capital cost. We would be able to offer a far lower environmental impact upstream and a much improved environmental situation downstream.

This river is loaded with materials from the Abitibi mill at Iroquois Falls, and aeration of the water is of critical importance to the fish species downstream. With our oxygen saturation from the large amounts of oxygen that we inject, we can virtually clean up the river downstream. The material going through the plant coming from the upstream source is essentially integrally mixed with the oxygen saturated in the water and reacts with the oxygen as it passes through the system. In fact, this is a sewage disposal that has been patented by a major Canadian company for jus disposing of sewage in deep-well situations where they pump the sewage into a deep well and then blow oxygen down into it. We get that as a byproduct of our plant without any cost.

1530

At the Long Sault project, we currently have investors extremely interested in backing the proposal and we are now waiting for Ontario Hydro to confirm whether it will purchase the power from the site. There is some degree o difficulty over line connections and the availabil ity of line capacity to the site; so we are waitin for confirmation that it will be able to buy th power.

We have also indicated to Hydro that we ar willing to build a peak power plant at the site wit large peaking capacity if the rates are there t justify the additional capital cost of building th storage chambers to accommodate the air re quired for peak generation.

I would like to mention briefly something tha you could put under the vague heading o pipe-dreams, but there are no technical reasons i will not work. It has been confirmed with Acre Consulting Services Ltd. and the people a Waterloo University and Arizona State Universi ty who have been working with us on the project.

If you used new power technology on development such as the Mattagami redevelop ment, you would end up with 750 megawatts o peak instead of 379 megawatts of peak and wit 170 megawatts of average power over the yea instead of 84 megawatts of average power. If yo extended that to a plant like Sir Adam Beck 3 you would be able to move the peak power fro 532 megawatts to 1,060 megawatts and th average power from 116 megawatts to 23 megawatts before you took into account the fac that, using air storage, you could totally retim the operation of the plant using the larger flow that are available at night at Niagara Falls t compress air without being limited by the lack o

ıncidence between the requirement to have ge amounts of water flowing over the falls ring the day while at the same time your peak s during the day, when that water was not ailable. I would like to leave you with those ughts.

In summary, new power is an Ontario hnology. The patents are held by us here in tario. New power has a lower capital cost than y other technology that we know of. New wer can be built more quickly than any other hnology since it uses off-the-shelf compo- nts and Canadian mining expertise. New wer uses less fuel than any other generation ans. We can support a BTU-per-kilowatt-hour e that cannot be matched by any other power oduction means. It is environmentally benefi- l and it is labour-intensive as opposed to uipment-intensive. We feel that nuclear power a logical choice for future peak demand and at new power can offer an alternative to nuclear wer. Thank you very much.

The Vice-Chairman: Thank you. Just as a atter of my own curiosity, I visited an old mine Cobalt on a mine tour. I remember, as part of at tour, they showed us some of the wooden pes that transported the air to the various ines. No one explained at the time where the air me from. What I always wondered about was w they contained air in those wooden pipes. ey were staved pipes, like barrels.

Mr. Richardson: Actually, the main part of e pipeline was all steel pipe. It was imported om Germany in 1909 and brought over piece by ece by ship and then hauled in by horse. There as some wood stave pipe near Cobalt, but it was rhaps less than a mile of the total system.

The main part of the system was all actual steel pe. Interestingly enough, if you want to talk out issues like pollution, we had the pipeline alysed. Since it has been there so long, we ere interested in seeing what gases came out of e air when it came up from the underground, d one of the best ways, we felt, was to analyse e steel in the pipeline. We sent it away and und that the pipeline was essentially like the rrent trans-Canada pipeline in its composition, cept it had a very high sulphur content.

We could not understand this because we uld not see where the sulphur was coming from the system. The Montreal River is clean and e rock shows no evidence of sulphur. We asked e test lab to analyse the inside of the pipe versus e outside of the pipe. They found that the inside the pipe was perfectly clean and the outside of e pipe had an extremely high sulphur content. The plant acts as a tremendously good scrubber. The air coming up from it we have had analysed, and it is the purest air you would want to find, except that it is slightly depleted in oxygen because of the preferential absorption of oxygen in the water.

Mr. Charlton: We have talked before, and I am glad you have the demonstration project under way. When we talked last fall, you talked about everything you talked about today and you also talked about your estimates of the cost per kilowatt of power out of a new power plant. Could you update us on that?

Mr. Richardson: Sure. What we have been able to fairly well confirm now is that a new power plant at what would be a good hydraulic site, let's say the Mattagami redevelopment or Long Sault, could be built at around the $1,200-per-kilowatt mark for total capital cost, including the underground work in civil works, turbine cost and a limited transmission line–we are not talking about a very long transmission line extension, but in this case, a 13-mile transmission line extension–an all-in price of about $1,200 a kilowatt installed. Those are average kilowatts I am talking about, not peak kilowatts.

In terms of its cost to generate power, we feel it is realistic to look at about 2.3 to 2.6 cents per kilowatt-hour in these plants; so it is quite a low operational cost. Actually, when you do the analysis, the capital cost makes up a larger part of the total operating cost than the fuel cost, if you look at it in a private sector way where you want to recover your money in, let's say, less than 10 years.

Mr. Charlton: I understand from what you have said that you are presently in negotiations with Ontario Hydro around the Long Sault site. Knowing how Hydro feels about negotiations and probably how you feel about them, I certainly do not want you to say anything you feel will jeopardize those negotiations, but can you maybe tell us essentially where those negotia- tions are? Are we going to see a commercial-size plant we can have a real look at in the near future?

Mr. Richardson: Let me answer the last one first. I certainly hope we see a commercial-size plant in the near future because it is the only possible way we have to recover about $750,000 worth of investment. We have made a very serious statement that we are interested in developing this.

I think Hydro is moving fairly quickly to allow us to connect to the grid. I know they have some grid problems in the northeast. They have

indicated what those problems are. The grid just is not up to handling a lot of new development. The Cochrane wood-fired plant is coming on line and is taking up most of the slack that was available in the grid. I think Hydro is into the planning exercise now and we are just waiting to see when that planning exercise comes out.

I do not think we will be building a peaking plant because I do not think at this time the rate structures are there to allow good capital investment to building a peaking plant in a private generation sense in Ontario. There has to be, obviously, some incentive to build a peaking plant because capital costs of creating underground storage are higher.

What we seem to have seen in the rates so far that were offered or discussed in peaking is that if you average them out back to an average-power production, they are virtually the same as the rate you are getting for average power. Obviously, the thing to do is to build the average-power plant and get virtually the same revenue. I think that may change in the future. I hope it changes in the future.

Mrs. Sullivan: What kind of incentives other than rates would you need to provide peaking power?

Mr. Richardson: We never really thought about that. We are carrying on strictly as a financial negotiation and basing it on the merits of what rates are available. The project, we have totally assumed, would fly or not fly on the basis of what rates were commercially available. That would be a separate question to consider and we have not really done so.

1540

Mr. Charlton: Just to make what was being asked there clear, the proposal they are negotiating with Hydro is over five megawatts, so the whole package is in negotiation. It is not the buyback rate we see referred to in presentations from time to time.

Mr. Richardson: We are finding it is a very funny negotiation because Hydro has different rates for natural gas and different rates for hydraulic and we are the first people to cross that boundary. Normally, you are either gas or hydraulic, and we are both. There is some discussion over what portion of our power is actually hydraulic and what portion is natural gas.

Mr. Charlton: I just have one last question. My last question refers to the last comment you made about the pipe-dream. It would seem to me, based on everything you have said and given a few years to substantially prove the technolog that the technology holds the potential at least t cause major alterations in the whole project i which Hydro has been involved and in which w are presently involved in terms of planning fo the future of power in this province. It woul seem to me that from that perspective it would b useful if your initiatives proceed as quickly a possible. Do you feel confident in terms of th work you have done to date and the work yo have done with those who are now backing yo that this technology could provide a major ne perspective in terms of our planning horizons?

Mr. Richardson: We know it can produc major impacts under the conditions we hav tested. For instance, at Ragged Chute we wer testing under a head of 50 feet and a flow of abou 50 cubic metres per second on the Montre River. That is a large plant; it is seven megawatt of compressed air, and by the time you convert to new power, it becomes about 18 megawatts. I is not a small plant.

All the theory suggests you can tandem thes plants or essentially scale them up and produce plant of any size. There is no restriction we kno of which would limit that capability, but again until somebody actually builds one you do no know for sure. I would be very interested to se Hydro take some interest in the possibility o using these plants in the future or doing som serious scientific looking at them with us. That i really all I can say. I would welcome anybod looking at it with us. Certainly, we have limite resources. We are using the two best hydrauli experts in the world, who have both decided it i a tremendously exciting project. We will b moving on as quickly as we can with them, bu we do not have the resources of Hydro.

Mrs. Grier: Following up on the question o what limits it, being a nontechnical person, need to understand what limitations there are. I it the flow? Is it the height? What governs the siz of a project at any particular location?

Mr. Richardson: What governs the project i the head drop or the head available at the site an the flow of the river. At a site that was 50-megawatt hydro site, we could not produc any more average power than about 100 mega watts. We are limited by that. The limitations was referring to are things like, for example, i you tried to direct the Niagara River into one o these plants, you would have to do a lot o thinking about how you were going to divert i and how many shafts you needed, how man underground tunnels you needed and how bi they had to be. As far as we know, there are n

mits on those types of things because you can reak it up into modules that work, and we have one a lot of study with the underground mining eople to determine what our maximum sizes are or any given part of a plant.

For instance, the Ragged Chute plant uses one nderground tunnel, two intake shafts and one utlet shaft. The plant we are proposing at Long ault is about three times the size and it would se two underground caverns, because you reach he largest cavern you can build without it falling n on you. It would use about six down shafts to ccommodate the large flow of water and it vould use two outlet shafts because once you each a certain size it is a lot cheaper to build two 0-foot by 20-foot shafts than it is to build one 0-foot by 60-foot shaft because it falls in on self.

Mrs. Grier: When you say there is no amming or flooding required, there is some ind of a dam or head required at the intake hutes presumably?

Mr. Richardson: Yes. If you looked at a long eries of rapids like Ragged Chute–actually I can how you here.

Mrs. Grier: The very first initial picture naybe.

Mr. Richardson: This is a really good xample of what happens. The plant itself is up in ere with the forebay area there. You can see the lam that was built. It is a continuous overflow lam. It was just built to control the height of the vater above the plant. It is about eight feet tall.

If these rapids had progressed further back up nd you had used a slightly longer tunnel, you ould have used, let's say, a three-foot dam or a wo-foot dam just to control that intake water and divert it into the plant. But if you built the comparable hydro plant, you would be building a dam somewhere down across here and flooding all those rapids back up so that you could accomplish the head right at the outlet.

Mrs. Grier: But if you are tunnelling down, how does the height of the rapids come into it? You can go down as far as you want.

Mr. Richardson: Yes, you can. There are two totally separate things happening here. The amount of power that we produce or the number of units of compressed air that we produce is a function of the difference from here to there and the flow of water. It is the height times the number of units of water that go through the plant. That sets how much air we can produce.

But the pressure of the air, or just the energy in the air, is totally set by that height. They are quite independent. So the height that we are using underground here has nothing to do with how much air we produce. It just has to do with how much pressure it is under.

If we sank this whole thing another 200 feet, we would get about another 45 pounds per square inch of pressure, but we would not get any more of it. We would get the same amount but under more pressure.

Mrs. Grier: I see. One other question, if I may. You are using natural gas at the Ragged Chute site?

Mr. Richardson: At Ragged Chute we have not installed a turbine because of some constraints on what we can do with a turbine at that site.

Mrs. Grier: How do you get the fuel to the remote kinds of sites that would be applicable to this technology?

Mr. Richardson: We have had long discussions with TransCanada PipeLines Ltd. They felt that there was no problem in getting the natural gas to the sites. In the case of Long Sault it is about 12.5 miles north of Cochrane. The gas pipeline extension is only 12.5 miles because the pipeline comes right through Cochrane.

In the case of, let's say, using it at Little Jackfish, it is a short pipeline extension there. Just for economic reasons we are trying to pick sites right now that are close to gas and close to electricity. Fortunately the gas pipeline runs across the top of Ontario. That puts you fairly close to all of them. But the gas pipeline is not that expensive compared to the power output of your plant. It is actually a minor cost.

The Vice-Chairman: Are there further questions? I have some questions of my own. Guided by the law of conservation of energy, falling water in my mind has the capacity of producing so much power in the falling water. Why does falling water that incorporates air bubbles produce any more power than would have been produced by harnessing that water to a turbine?

Mr. Richardson: It does not. I will go back to a slide here and let you view that.

The Vice-Chairman: So the law still holds?

1550

Mr. Richardson: We compress the air. That air, which is produced by the waterpower, gives us only 33 per cent of our total power. That is all the air is contributing to the total process. We then bring in natural gas. The natural gas is giving us 33 per cent, 33 per cent of our total power is coming, quite legitimately, from natural gas directly through the gas turbine, and 33 per

cent is being recovered as waste heat. You cannot recover the waste heat unless you happen to be using the water power portion which produces this very cold air. It is called isothermal compression. It means that when the air is compressed, it does not heat up, so you have this very cold air that you can heat up with the waste heat from the turbine.

We are not producing any more power from the site with the water than we could with a hydro turbine. It is just that we are mixing in natural gas and using the energy in the natural gas. If you look at it, we are taking some power from the water and some power from the natural gas and putting the two together, and it is the sum of those two powers that gives us the larger power from the water power site.

The Vice-Chairman: The part I could not understand was, why could you not separate, take the water power off and just work with natural gas, compress the air with a piston compressor or your regular turbine?

Mr. Richardson: The question we always get asked by the engineering people when they first see the project is, "Why can't I just build a water power plant and build a natural gas plant right next to it and get the same power out?" Well, you cannot, and the reason you cannot is because in the best natural gas plant you are going to have exhaust gases going up the stack at something like 400 or 500 degrees, and there is nothing you can do about it. There is no useful way to recover that heat, because even if you are recovering it to steam cogeneration, it is going to go up at 400 or so degrees of heat.

What we can do is transfer the heat that was going up the stack into this very cold air from underground and recover it. That is a substantial amount of energy which is not available from the sum of the two technologies. The reason we can do more at a site is because we can recover the waste and no other technology can do that.

The Vice-Chairman: If there are no other questions, then thank you very much for attending.

Mr. Richardson: Thank you very much for letting me speak.

The Vice-Chairman: We are right on time. In fact, we are a few minutes early. We will invite the Ontario Natural Gas Association to come forward. Welcome, gentlemen. I will let you introduce yourselves and then go right into your presentation. My name is Jim McGuigan. I am not normally the chairman. The chairman is away for this afternoon.

ONTARIO NATURAL GAS ASSOCIATION

Mr. Pinnington: Good afternoon to you an the members of the select committee. My name i Paul Pinnington. I am the president of th Ontario Natural Gas Association.

Accompanying me to my immediate right i Charles Safrance, chairman of the associatio and senior vice-president, operations, Con sumers Gas Co. Ltd. To Mr. Safrance's right i Mark Wolnik, second vice-chairman of th association and vice-president of operations ICG Utilities (Ontario) Ltd.

On my immediate left is Dennis Cornelson vice-president, marketing, AEC Oil and Ga Co., a division of the Alberta Energy Co. Mr Cornelson is vice-president of the gas resourc section of the Canadian Gas Association. Mr Cornelson came from Alberta to be with u today, and we welcome him to our panel as representative of the natural gas producin industry from western Canada.

Jack Cooper, senior vice-president, marketin and gas supply, Union Gas Ltd., was also to b with us this afternoon, but he is involved in a appearance before the National Energy Board Regrettably, they have asked that he remain i Ottawa and continue with cross-examination.

We are pleased to be with you today and than you for inviting us to bring our views to th select committee on energy. On behalf of th members of the association, we have prepared formal submission to this committee regardin Ontario Hydro's Draft Demand/Supply Plannin Strategy. This document has been distributed t all members of the committee and committe staff. We have also prepared an overview of ou submission which we propose to take th committee through at this time.

Juri Otsason, who is on my far left, manager industrial/commercial marketing, Consumer Gas, will make the presentation. He will also b available should the committee have any detaile questions regarding specific applications c technologies. With your concurrence, Mr Chairman, I propose that we respond to an questions at the conclusion of Mr. Otsason' presentation. The submission, along with Mr Otsason's speaking notes and visual aids, hav been provided to the clerk of the committee an Hansard has copies of the same materials Additional copies of our submission are availabl to interested parties here present. With you permission, I would ask Mr. Otsason to proceed

Mr. Otsason: We are here, and I am here really speaking on behalf of the Ontario Natura Gas Association, which is a trade associatio

presenting all segments of the natural gas industry in Ontario. It has three sustaining members, the three major gas utilities—Consumers Gas, Union Gas and ICG Utilities (Ontario). It also has approximately 80 other members which are suppliers of goods and services to the gas industry and really represent a wide spectrum of suppliers.

One of the major roles of the Ontario Natural Gas Association is to represent the Ontario gas industry viewpoint in public policy debates relating to energy issues. The three major gas utilities in Ontario serve approximately 1.6 million customers and directly employ more than ,000 people. The industry pays approximately 108 million a year in taxes and reinvests approximately $330 million a year into the provincial economy.

I would like to quickly run over why we are here today: first of all, obviously, to provide our industry's response to the Ontario Hydro demand and supply planning strategy document, but also to provide input into the development of the provincial energy policy.

1600

We will be making some specific proposals that relate to Ontario's electricity supply strategies and options, and as Mr. Pinnington mentioned earlier, we will be glad to answer any questions that you might have after the presentation.

The way we see it, the energy objectives for the province and the criteria therefor have been spelled out by the ministry, and really by the Minister of Energy (Mr. Wong), early on in your sessions of this committee. He highlighted four key criteria for the future electricity supply for the province.

First, the way we see it, the electricity supply has to be adequate. Second, it has to be affordable to the users in the province. Third, it has to be supplied in an environmentally acceptable way. It should not have a detrimental effect on the environment. Fourth, the province, of course, has an objective to improve its overall energy efficiency.

We at ONGA feel that all those four criteria are very valid. However, we would like to suggest that there are two additional criteria that should be kept in mind and looked at. The first one of these deals with the diversity aspect, to increase the diversity of the electricity-supply function; diversity really in terms of the fuels that are used to generate the electricity, in terms of the technologies that are used to produce the electricity and in terms of who provides the capital, the dollars, in fact, to put the facilities in place. The benefits of diversity were also brought out and recommended in the energy options study that was recently released by the Department of Energy, Mines and Resources.

Another criterion that we feel is important is the availability of the technology. How proven is the technology? I think that is an important factor to consider in selecting the alternatives.

We will be making some recommendations as part of this presentation, and we feel that our recommendations satisfy the four criteria outlined by the minister, as well as these two additional criteria.

How can natural gas be used to supply electricity in the province? There are really three different alternatives. I will touch on these fairly quickly. You can use gas in existing central electricity generating plants to displace coal or oil, you can use gas in what is referred to as combined-cycle plants to produce electricity or you can use gas in cogeneration facilities to produce both electricity and useful heat.

This is a typical central electricity generating plant. As I said, gas can be used there to displace coal. The purpose obviously would be to reduce the emissions from that plant and, in a lot of cases, also improve the performance and efficiency of the existing coal-fired plant.

There are several subcategories in this area. One is the straight conversion from coal to natural gas, which is repowering. The next one would be to fire some coal and gas in conjunction to realize some reductions in emissions. That is referred to as cofiring. Another strategy to use gas to reduce emissions would be to fire gas at times where the air pollution concerns are particularly acute or when gas is available at a lower cost in off seasons. Finally, you can use gas together with other technologies, such as sorbent injection or reburn technologies, to reduce emissions of sulphur oxides and nitrogen oxides.

In all these options or alternatives, the use of natural gas will help to reduce emissions of sulphur oxides and nitrogen oxides and also will reduce the carbon dioxide emissions.

The next alternative is a combined-cycle plant. A combined cycle really is a process where you have two sequential cycles which are used to produce electricity. You use the waste heat from the first to drive the second stage. The net effect is that you get a considerably higher efficiency than you would in a conventional central thermal plant. A typical central thermal plant has an efficiency of 30 per cent to 32 per cent. A

combined-cycle plant will offer you efficiencies in the 45 per cent range, so it is about one and a half times as efficient.

There are some other advantages, in our view, of combined-cycle plants. They can be installed in smaller increments than typical central plants. Combined-cycle plants typically are frequently installed in blocks of 200 megawatts or something of that order of magnitude; you can install them in small increments. This offers the opportunity, obviously, for private ownership of these plants, so it will allow private investment and avoid the need for Ontario Hydro to make that investment.

Also, since they are smaller units, they can be located strategically closer to the points of need for the power they will produce. You will eliminate or reduce the transmission losses that are incurred in transmitting power from a large central plant to a distant point of use for that electricity.

Obviously, again, a major benefit of natural-gas-fired technology is the emission benefit. This slide shows the comparison between a typical coal-fired central plant and a natural gas fuel combined-cycle plant. Looking at sulphur oxide emissions, the major contributor to acid rain, the natural-gas-fired combined-cycle plant is really insignificant in terms of SO_x emissions.

In terms of particulates, again the gas-fired plant is much cleaner than the coal-fired plant. This particular example uses a coal-fired plant that is equipped with electrostatic precipitators; it is not an uncontrolled coal-fired plant.

In terms of nitrogen oxide, the second contributor to acid rain, again natural gas has a considerably lower emission rate than a coal-fired plant would have.

Finally, in terms of carbon dioxide, which is becoming a concern because of the potential greenhouse effect, because of the lower carbon content in natural gas fuel the emission rate for a given amount of electricity generated in the combined-cycle plant is only about 44 per cent of that you would emit if you generated that electricity through a coal-fired plant.

One other thing in relation to the carbon dioxide emissions is that the various clean-coal technologies being discussed which are potentially available are all aimed at reducing sulphur oxide emissions primarily. Some of them will also reduce NO_x emissions. However, none of those technologies will reduce the CO_2 emissions from a coal-fired plant.

These technologies are certainly not new. This is a cogeneration combined-cycle plant which is installed at Dow Chemical in Sarnia. I unde stand there has been a report submitted to th committee which deals with that in greater detai This is an example where a plant is installed ve much at the location where a lot of the power required; in other words, in Dow's own oper tions. It is a plant which has been in operation f a number of years.

Finally, coming to the cogeneration altern tive, this is a process where you really burn fuel–we are suggesting natural gas–to produ two useful outputs: one being electricity and t other being thermal energy, either in the form hot water or steam, which would be used in industrial process. This is the most efficie alternative. Typically, efficiencies are more th 75 per cent in a cogeneration plant.

Again, it is not unproven technology. The are a number of cogeneration plants in existen in Ontario right now. I mentioned the Dow plar There is one down on the lakefront here Toronto, Redpath Sugars, which has be operating for 30-odd years. You can also u cogeneration in commercial or institution applications; the University of Ottawa is example of that.

1610

Again, there are a number of technologi available. They are well proven and w established. They can range from gas turbines steam turbines to reciprocating engines. It is well-proven, off-the-shelf technology. That the technology for generating electricity wi natural gas.

The next item I want to deal with is the g supply availability and deliverability. Obviou ly, if you are going to use gas, it must available and you must be able to get it her There have to be reserves, it has to transportable to Ontario, it has to be available a reasonable price and there has to be flexibility the way you can contract for your requirements match the requirements of the project.

As we are really into a continental natural g market or heading in that direction, I am showi both US and Canadian proven and potent reserves on this slide. I think the more meanin ful numbers or bar graphs to look at are the on on the right, which look at the relationsh between the reserves and the production rate the form of a reserve-life index.

If we look at Canada on the basis of the prov reserves, Canada has a reserve-life index about 35 years. If we also include the potentia that is, potential which can be produced w existing technologies–we are looking at

serve-life index of about 150 years for Canada. ooking at the United States, again on the basis proved and potential reserves in the US, it has eserve-life index of about 60 years.

The point of this is that there is certainly gas ailable to be contracted for to supply electricity neration within the planning horizon of Ontar- Hydro at this time.

I think I will skip that one and look at liverability. You have to be able to move the s from western Canada to Ontario. The isting pipeline network, as you might have ard, is running fairly close to capacity. That is ite intentional: it is good, it is efficient. The isting pipeline network can be upgraded quite adily.

The TransCanada PipeLines system typically uld be upgraded in about 18 to 24 months to crease its capacity to be able to transport gas for y new requirements in Ontario. That 18- to -month horizon is certainly no longer than the ne frame you would be looking at in terms of tually installing a new cogeneration plant, mbined cycle or what have you. Getting the liverability system in place should not be a mitation.

The next key issue I want to look at is the icing aspect. This is an area where we have me serious concerns about some of the sumptions that went into Ontario Hydro's raft Demand/Supply Planning Strategy. What I n showing here are a number of forecasts in rms of what the cost of gas will be, with Ontario ydro's in the blue. We looked at more forecasts an are shown here. What we are showing is the gh to low range of other forecasters: the epartment of Energy, Mines and Resources in urple being the highest other forecast we saw; e National Energy Board green line being the w end of the spectrum. The Ontario Natural as Association's internal forecast runs roughly the range of the green and the yellow–it is very lose to those two lines.

The point I want to make here is that we see vo basic problems in Ontario Hydro's forecast hich underlie its decisions and recommenda- ons in DSPS. First, the starting point for gas rices is high. In their assumptions, they are sing a price slightly over $5 per million BTUs in 988. The other forecasters we have looked at are pically running in the range of $3 to $3.25 per illion BTUs, and the actual price, at least on hort-term, one- to two-year contracts to indus- ial suppliers right now is, in fact, running at bout $2.40 to $2.50 per million BTUs. So Ontario Hydro's starting point for gas prices is off by a factor of approximately two.

Ontario Hydro in its forecast also escalated the gas prices at a considerably higher rate than any of the other forecasters. As a result, by the year 2005, they are forecasting a gas price of about $21 or $22 per million BTUs while, for example, the Ontario Ministry of Energy, the yellow line, is forecasting a price of about $7.50. So we are looking at about a three-to-one differential between those two forecasts by the year 2005.

Clearly, the attractiveness of natural gas options in Ontario Hydro's analysis was diminished drastically due to its assumptions about gas pricing. We feel the role of natural gas should be re-evaluated using some assumptions for current and future prices for gas that are more in line with what other forecasters are projecting, and we feel that any such re-evaluation should be done in consultation with the gas industry.

Looking now at how one can contract for gas for a cogeneration or a combined-cycle project, there is a lot of flexibility. There are a lot of sellers of gas out in western Canada who are very much looking for markets. So you have a lot of flexibility in terms of the duration of the contract that you might enter into. Anything from one year to 20 years-plus is available. You can select one supplier or, for a large project, you might look at using multiple suppliers to get some diversity benefit. You are not putting all your eggs in one basket.

In terms of pricing, again, a large number of options can be considered. You can have fixed prices for a fixed term or you can look at various ways of indexing the gas price. Indexing alternatives available are inflation rate, the oil price, electricity price; there are a number of alternatives.

Another option available is that you can buy the gas in the ground. In other words, you can buy actual reserves. That reduces some of the uncertainty about future gas prices because you now know what your commodity will cost you. Your only uncontrolled effects on delivered gas price will be the cost of actually getting the gas out of the ground, any royalties and any transportation costs. This approach, by the way, was used for a project, a large-scale, combined-cycle plant that is going into Syracuse, New York. They bought reserves in the ground in Alberta and prepaid for them. That is the approach they took.

Another alternative to this is for a developer of a cogeneration project or Ontario Hydro to participate in joint ventures to develop new

reserves. Finally, you can mix and match to assemble a package of supplies that fits the particular characteristics of the project you are looking at.

1620

Recapping, what can the private power option offer Ontario? As we mentioned, there are a number of benefits the private power option can offer Ontario, and I would like to run through them quickly again.

First, it can increase the fuel-use efficiency in the province. The natural-gas-fired options are all very efficient and this, in turn, will help make Ontario's industry more competitive since it will have lower-cost electricity supplies available to it.

Using natural gas for electricity generation will help reduce the emission levels drastically. As we saw before, the natural-gas-fuelled options have much lower emission rates for all the pollutants than, for example, coal-fired generation.

Another advantage, an efficiency advantage again, as I mentioned, is that you can locate cogeneration plants and combined-cycle plants closer to the point of use. You are not losing energy in transmitting it over long distances.

By developing the private power option you can get the diversity benefits. You have an increase in reliability by having a diverse number of smaller generators, different technologies and different fuel sources. You also get the financial diversification benefit by having the private sector, in fact, investing in owning and operating the generating facilities.

Finally, since it would be private sector involvement, there would be a benefit to the provincial revenues through tax payments by those private generators. So we see that the private power option offers a lot of potential benefits, but we believe there is a need for some provincial energy policy steps that recognize the role that natural-gas-fired electricity generation can play and that help natural gas to move into this area.

We feel that the government needs to establish a policy that puts in place an independent body to implement its policies, to review and recommend any changes to policies and to arbitrate in any matters relating to private power generators and the buyer, Ontario Hydro.

We feel there is a need to have a process put in place to develop buyback rates that reflect the true worth of electricity that is supplied by that private generator to Hydro. It must be based on the true avoided cost for Hydro.

We feel that if the appropriate policy framework is put in place, the target of 1,000 megawatts of parallel generation or private generation that Hydro has set can be reached and exceeded. However, if an appropriate policy framework is not available, we feel that the 1,000-megawatt target might not be reachable; it might be too optimistic. So that policy environment needs to be developed.

Wrapping up, we have basically three recommendations. As I mentioned, we feel natural gas has a strategic role to play in the supply of electricity services for Ontario. I think that role needs to be reassessed because of some of the supply and price assumptions that are reflected in the current DSPS. Reassessment is required. We feel that such a reassessment should be done in consultation with input from the gas industry.

The second key component, as I mentioned, is the buyback rate. The buyback rate must be based on an all-inclusive, avoided cost basis and really reflect the true worth of that power supply by the private generator.

Finally, there has to be an independent body other than Hydro that will, in fact, implement the province's energy policy in this regard and act as a regulator and arbitrator on parallel-generation-related issues.

Those are our recommendations. We are very pleased to have the opportunity to be here. We would be glad to work with the government of Ontario, with Hydro or with any other government agencies towards this end. Thank you very much.

Mr. Chairman: Thank you, Mr. Otsason. I think perhaps questions might come now before we hear from other presenters, or do you have other presenters?

Mr. Cureatz: I understand your brief will be handed out shortly, because we do not have the benefit of having it in front of us. But with the conclusions, the last aspect about consultation with the gas industry, I had the feeling that you would feel better that if there is not now, there should be an overall approach to energy in the province and better dialogue with, for instance, Ontario Hydro.

Do you feel there is a gap there at the moment in terms of discussion, energy uses and payback rates, etc., that you have indicated some concern about?

Mr. Safrance: I think the problem that occurs is that there could be many sellers, but there is only one buyer. If there is only one buyer, then the buyer dictates the standards on which you are going to purchase and at what price. If there were

›me other mechanism in which that could be ›corporated in the buyer-seller marketplace, it ›ould be far easier.

Mr. Cureatz: This morning we had a witness ›dicating the possibility of some kind of ›dependent overseer of Ontario Hydro, a ›ecks-and-balances kind of approach. Would ›u be comfortable with that kind of setup, ›cause the practical reality is that I do not think ›e are going to set up another one or two ›ectricity-producing agencies of the calibre of ›ntario Hydro to which you can have a ›pitalistic approach for you to be approaching ›other utility in saying, "What would you ›fer?"

Mr. Safrance: I think, as Mr. Otsason ›entioned, the first step is for the government ›self to issue some sort of statement saying that it ›ppears natural gas could be a possible partner in ›e generation of electricity in Ontario and that ›e industry in Ontario should work towards this ›d, if economically possible.

That would start things rolling, relative to an ›dependent body. Basically, we are talking ›out some element that could be introduced to ›ake the balance between buyer and seller fairer, ›guess the word is.

Mrs. Sullivan: I am interested in your ›mments about the long-term supply of natural ›as and your analysis of the extent of potential ›serves, as opposed to the reserves that are now ›n stream, if you like. I am wondering, in terms ›f potential reserve and of ultimately calculating ›osts and cost increases over a period of years, ›hat you are seeing in terms of the increase or the ›crements in the cost factors relating to actually ›nding those reserves. Is there some sort of ›easure of thumb that you know there is going to ›e an increment that is almost automatic?

Mr. Pinnington: I think Mr. Cornelson from ›lberta would be best qualified to respond to that ›uestion.

Mr. Cornelson: Yes, I think I can. I think the ›oint to begin from is that there is a very large ›source base that we see in both Canada and the ›nited States, compared to our current levels of ›roduction and compared to the amount of gas ›at has already been produced.

It is certainly true, I think, that you tend to ›ant to look for your lowest-cost gas first before ›ou go to your higher-cost gas, but we have seen ›at there is a strong correlation between the price ›f gas and drilling activity. As the price goes up ›nd if the demand is there, then the reserves are ›dded.

The study that was done in the United States by the US Department of Energy concluded that there were some 580 trillion cubic feet of the 1,000 trillion cubic feet that could be brought on stream for prices of gas of US$3 or less. That compares to their proven remaining reserves of 159 trillion cubic feet. It is a very large number.

Historically, US gas prices probably peaked at about something under $3 and then have come down with the gas-on-gas competition that has resulted from deregulation. I am saying all that to simply come to the conclusion–and you can draw similar conclusions in Canada–that generally our finding costs are much less here. The levels of pricing needed to bring on the reserves are also comparably lower. But in practical terms, I do not see prices or the cost of gas rising so quickly that one needs to be particularly concerned about it.

Over time, of course, yes, you do expect some kind of correlation, but I think with the kind of reasonable gas prices that have been projected there that are being presented by ONGA as being reasonable, we are looking at an awful lot of supply that we could bring in at prices that are quite comfortable for us in the industry.

Mrs. Sullivan: I think I saw a squib today in the Toronto Star on the business page talking about the current price of gas being less than the finding cost.

Mr. Cornelson: That is true. The current average price of gas in Alberta is such that if you look at the gas that has been found in the last several years, much of that would probably be uneconomic unless gas prices increase in the future.

The reason producers are still exploring for it is that they do have an expectation of higher prices, but when I talk about an expectation of higher prices, I am talking about not an order of magnitude increase but some reasonable increase.

If the price of gas is $1.60 today on average in Alberta, which it is, if you had the price go to $2.60, for example, that would be quite a meaningful increase in the price of gas. It is those kinds of increases we are talking about.

Mrs. Sullivan: The next question is on a totally different topic. I think on your last slide you talked about buyback rates reflecting the worth of the electricity produced. I wonder if you would define the word "worth"?

Mr. Safrance: Basically, when we are saying "worth," in the past, any discussions on buyback rates were either the average rolling cost of electricity as opposed to the incremental cost of

electricity. If you are looking at the worth of electricity relative to cogeneration by natural gas, you have to compare it to incremental costs as opposed to average. Obviously, I have not answered your question.

Mrs. Sullivan: I am not sure. Let me just try it a different way. Why is your estimation of the worth of electricity produced different from the estimate of Ontario Hydro of the worth? There is a value judgement in those words. Hydro is using them one way and you are using them in another way. What we would like to see is where you are different.

Mr. Safrance: I cannot answer that any differently than I have.

Mr. Otsason: Maybe I can add to that. I believe Ontario Hydro really looks at the rolled-in cost, average cost of producing electricity out of its existing system. What we are suggesting is that by looking at it on a marginal basis, you really should look at what it would cost Hydro to produce the next incremental units of electricity, the next incremental units of capacity.

That price that is paid to a private generator should reflect that because that is the cost Hydro will avoid. By not having to build Darlington B, they avoid a certain amount of cost. The price they pay to the private generator should reflect that benefit.

Mr. Cornelson: I am certainly not an expert on this, but the other point with Ontario Hydro is that I believe in terms of establishing these avoided costs, they omit many of the costs that a private sector, commercial operation would normally include, such as the cost of things like income tax return on equity–those kinds of things that are normally matters that matters a private sector company could look at. Perhaps you can elaborate on that more so than I can.

Mr. Otsason: Yes. There are those and other things. In terms of comparing a private sector generator versus some body like Ontario Hydro, which does not earn a return on the capital it has invested and does not pay taxes to the province, should those be factors that are considered in setting the buyback rate? We do not have the pat answer for how those things should be considered. What we are recommending or suggesting is that there should be an independent review that looks at all these aspects and establishes the basis for setting that buyback rate.

Mrs. Sullivan: For projects above five megawatts, there are individual negotiations on projects.

Mr. Otsason: That is right; it is a negotiat price.

Mrs. Sullivan: Would you prefer movi towards a standard contract?

Mr. Otsason: Not necessarily. It could be procedure that is developed, some guidelines f on what basis the price would be set, n necessarily a hard number, but a procedur things and factors to be taken into account a then possibly looked at, certainly for larg projects, on a project-by-project-specific bas but there should be an independent review th establishes the procedure and the guidelines to used in setting the price.

Mrs. Sullivan: Do you have a long lineup just have one.

The Vice-Chairman: One more.

Mrs. Sullivan: My last question relates your intervention and work with cogenerator We had a presentation the other day from Scept Resources Ltd. who are aggressive marketers natural gas. Their interest really is to diversi out-of-system sales. They have been, frankl going very heavily after the cogeneration mark and they are using some techniques, or putti forward some of the techniques; I do not kno how successful they have been yet. Are y finding there is that kind of interest? Are you individual sectors of the natural gas indust being swamped with people who are interested cogeneration projects?

Mr. Otsason: Yes. There is certainly a lot interest that has come to the fore in the last, le say, two years in cogeneration. There is also st a lot of doubt among the potential cogenerato because of the uncertainties around some of t policies relating to buyback, contracting requir ments and so on that are kind of offsetting t driver, which is the fact that gas prices have co down. The economics are starting to look bette

To give you an indication from Consume Gas, we have right now two people who a working full-time with potential cogenerato helping them to do first-step feasibility analysi Two years ago, we did not have anybo involved in that area. So there is a lot of intere but very little of it has gone beyond the stu stage at this point because there is a lot uncertainty still in terms of what will happen the buyback rates, the contracts and so on.

Mr. Cornelson: From our sector of t business, and also being an aggressive g marketer, I would reiterate that there is a ve strong interest. My perception is that the inter has not yet developed as strongly in Canad

articularly in Ontario, as it has in the United tates, but there it is being looked at as a very real lternative to nuclear power, for example, and ne potential and the actual demand in many areas ave grown incredibly large.

If the avoided-cost principles are right–and rom a seller's point of view, what I believe is nportant is that they be, first of all, based on a ully allocated cost principle, such as was escribed earlier, and that they also be put in lace and be predictable so that producers and narketers can count on it in terms of structuring hese arrangements–then you will find there ertainly would be a great interest.

The efficiency side of this thing alone makes it ery attractive to a marketer of gas because a narketer of gas is not only marketing gas, he is narketing total energy packages to consumers. That is kind of a full-service operation which is enerally very attractive to the consumer.

1640

Mr. Wolnik: I might add that in the ICG Utilities service area covering northwestern Ontario there is some significant interest in ogeneration from power plants and also from nills and lumber producers. We are actively ursuing those opportunities with those proposng the projects. But I agree with Mr. Otsason; he buyback issues and things like that still emain to be resolved before they become a eality.

Mr. Charlton: I would like to say, first of all, hank you for the presentation today. Some of the naterial you have presented tends to corroborate ome of the other testimony we have had from vitnesses who are not directly associated with he gas industry.

Specifically, we have seen over the course of he last several years in our hearings with Ontario Hydro some minor discrepancies in terms of numbers that get used in calculations from time o time. For example, I remember in 1986 there were some minor discrepancies in terms of the numbers Hydro used as forecasts of gross national product growth. You, basically, have so nany forecasters out there all throwing numbers around. I do not recall ever seeing a discrepancy as large as what we saw both in your presentation oday and in a presentation we had this morning in terms of the range of not only the current costs of natural gas but the projected forecast costs 20 years down the road. Does anybody have any idea what happened and why that discrepancy is so huge?

Mr. Cornelson: We do not. I wish they were right, from a producer's point of view, but I am afraid they are not.

Mr. Pinnington: They came forward, as well, in the Ontario Energy Board's HR 17 hearing. We were equally surprised at that time and rose on that occasion to seek clarification. We do not understand the logic behind the rates of increase that have been used.

Mr. Charlton: Presumably, in a situation like that, there would be some consultation with the industry involved. Was there any or none?

Mr. Safrance: To the best of our knowledge, there was no consultation in arriving at those figures.

Mr. Brown: I have become quite baffled about the prices of things as we have gone through the system, which I think is probably shared by the rest of the committee, maybe by everyone involved. One of the things is that with natural gas, we are obviously talking about a fossil fuel. In comparison to using another fossil fuel, which would be coal, do you have any figures on what you think it costs to produce a kilowatt of electricity or whether we are comparing apples with apples and fossil fuels with fossil fuels?

Mr. Pinnington: Do we have a comparison on what it would cost to produce a kilowatt of electricity?

Mr. Brown: Or a megawatt. Choose your unit.

Mr. Pinnington: I think that is a little out of our league. I expect Hydro would be best equipped to respond to that. Mr. Otsason could probably comment with respect to cogeneration equipment itself, some of the technologies with which we are familiar. But on the whole question of cost of a kilowatt, for example, I believe the technical committee that examined the DSPS, the Brooks committee, as we call it, asked some questions and was concerned about some of the logic employed there. I am afraid we are not equipped to discuss that area in any particular detail other than, as I mentioned, from a cogeneration point of view where we are talking with people about specific pieces of equipment.

Mr. Brown: The reason I am asking the question is, obviously, we have what Ontario Hydro thinks the differences are; I just wonder if you have some independent thoughts on that, because one of the reasons for choosing natural gas over coal would be not an economic reason per se, but an environmental reason or some other social value perhaps. Coal is in fact cheaper. I guess what I am trying to get at is what the difference is, and maybe you can help me.

Mr. Otsason: I am not sure I can give you a specific number. I would like to add or point out that you cannot look at the cost per unit of energy in that comparison, because there are a lot of other factors you have to look at. You have to look at the capital costs involved in using the two fuels. If you want to minimize your emissions using coal-fired technologies, you have to include things like cost of scrubbers and so on. There are capital cost aspects and there are operating cost aspects associated with all that equipment as well.

Just looking at it in terms of capital cost and direct dollars, it is a complicated comparison. If you want to include further the things that you are suggesting, things like the social benefit of having lower emission levels and so on, that is another additional factor that complicates the equation. We cannot give you an answer. We believe, I guess in a subjective way really, that natural gas has the ability to be the lowest-cost or the best option, and we are suggesting that it needs to have a fair review to make that comparison on a fair basis.

Mr. Cornelson: Perhaps I could add something to that. We have been involved in several cogeneration projects and actually looked at a combined-cycle project here in Ontario some time ago. Unfortunately, I did not bring the numbers with me and I do not recall them precisely, but I do recall in general the conclusion that if the avoided cost were priced on a reasonable basis–and that was the proposal being contemplated at that time; I think we were talking about electricity prices in the range of five or six cents a kilowatt-hour or something like that–natural gas could be competitive in a combined-cycle plant against the kind of average mix of thermal power generation that you have in Ontario now, which I understand is primarily coal.

That was even with a gas price, as I recall, that was at the kind of level that would in fact be a replacement-type cost for us. It was not the discount-gas type of situation. We were looking at kind of a replacement cost. It was competitive initially, and in fact gave us some upside, so that we could stand some further increases in gas prices before we bumped into the ceiling, if you will. Again, I cannot be too precise, but I know that in terms of doing this evaluation, we were very precise and came to that conclusion.

Mr. Brown: One of the other things, of course, that we have to consider is that fossil fuels are generally used as much as possible for peak load periods, which makes the electricity hopefully more valuable to the people who produce it. It is certainly more valuable to Ontario Hydro in a peak load.

I am also interested in the fact that you are from Alberta. I understand that Alberta generates most of its electricity from coal. Is that correct?

Mr. Cornelson: Yes, that is correct. I think it is a government policy there. They have an abundant coal resource base there. In fact, our company produces coal, some of which is sold to Ontario Hydro, so I have to be careful in my recommendations to this committee from a corporate perspective. I think western Canadian coal, for example, is certainly a better alternative than US coal. I understand that Ontario has been increasing its proportionate purchases of Canadian coal, and that is terrific.

I really look at natural gas as being a very important supplement and part of a mix. I think the marketplace will sort all that out. If you put in place the right buyback policies, based on a true avoided cost, then the rest of us have something to shoot at and will sort it out and decide which is the best route to go.

1650

Mr. Brown: Being a layman and having been in business, I always find that, like lawyers or anything, if you ask three different accountants they will give you three different answers on what true avoided cost is. You are obviously going to get three different answers. It is all in the way that you come at it. There is no marketplace, I guess is what I am saying. There is one buyer and when you have to rely on accountants and politicians, all that sort of thing, you do not come to what the market might come to.

Mr. Cornelson: The problem is that if you do not create some certainty and you leave it up to the market, if there is only one buyer, there really is not a market. You have to establish some certainty, some point of stability there and then you will see the response. You will see how much reaction you get. If you get none, then either you set the standard too low or in fact it is just not economic to develop it.

Mr. Brown: I think somebody suggested this morning we could price it properly, give a party and have nobody come and then we may have problems, if part of our strategy is to get a lot of cogeneration. If we think there is a lot of interest out there and there just is not, then we may also have a problem.

Mr. Cornelson: That is a possibility. But my understanding of the numbers I have seen is that

ou priced it according to the true avoided costs t have been calculated, people would come.

The other thing is I would like to take this portunity to stress, if I can–and I must say I do preciate the opportunity to be here and to have n invited by the Ontario Natural Gas sociation–is I think it is very timely for you to now to put these policies in place.

As I said earlier, there is a great deal of interest this option, in the United States for example, I think there could be here too. The whole nadian gas industry is in a process of tructuring now with deregulation. Buyers and lers are shifting their relationships and new ationships are forming. It is an ideal time for as eager sellers to be out there identifying this a legitimate option. If you wait too long, what l happen is the market will be completely tructured and then it is more difficult to erate interest.

The Vice-Chairman: If there are no further estions from committee members, our consul- t Mr. Passmore has some questions.

Mr. Passmore: One of the difficulties in ng the mop-up questioner is that you are lucky you have anything left to add, but I do have a ple of follow-ups to some questions that have n asked thus far.

wanted to make it clear in my own mind, and hink you answered this question for Mr. arlton, that there had been no consultation h any members of the gas industry, to the best your knowledge, in terms of the numbers that presented in the DSPS on the cost of gas. I k you probably answered that question. I k you said there had not been.

Mr. Safrance: To be more specific, there had n no consultation either with my company, nsumers Gas, or the ONGA. They may have e elsewhere that I know nothing about.

Mr. Passmore: As a result of the numbers that have got in the DSPS, as you know, Ontario dro has screened out gas as an option as being expensive. Now, to what extent–and we have rd a lot about letting the marketplace work so on–are we talking here about an issue of rket share? Is it that Hydro has screened out as an option because we are talking about the re cogeneration we get the more market share have for gas and less hence for electric ities? Is that the issue here?

Mr. Pinnington: I would not think that in fact e case. The reality is I think that Hydro has an mense nuclear momentum and that the con- t of using natural gas is really relatively small in terms of its view of the total need for power. I do not think that there is anything as machiavelli- an as concern for market share.

Mr. Passmore: Do you see that cogeneration provides an opportunity for increased market share for gas?

Mr. Pinnington: Yes I do.

Mr. Passmore: The question of having a party that the member raised over on the other side here, and members have been raising this issue on an ongoing basis during the hearings–the concern has been raised, what if we have a party and no one will come? Of course, depending on what you put on the invitation, that can determine how many people come to your party.

We had a consultant in here yesterday who had prepared a report for Acres on the whole question of the potential for gas cogeneration in Ontario. He ran some sensitivity tests that suggested that at six cents a kilowatt-hour, it would double the amount of gas cogeneration that would be implemented in Ontario. Do you have any idea, based on your assessment, of what would happen to gas cogeneration in Ontario if six cents a kilowatt-hour was put on the invitation?

Mr. Safrance: Just off the top of my head, I think it would more than double. Again, it would depend on specific projects, what sort of capital investment was required and what sort of long-term gas contracts you could acquire. As I say, off the record, at six cents, where do I sign?

Mr. Cornelson: I would verify that number. Our company has had a relationship with a US company called Solar Turbines, where we were jointly marketing cogeneration plants complete with the gas supply. Unfortunately, we have not delivered much gas to them because of our problems of accessing the US market due to transportation constraints; but in the process of doing that I learned from them that, in the United States at least, any time the avoided cost is priced above five cents US, they get a lot of economic incentive to put these plants in and an awful lot of activity.

Mr. Pinnington: I wonder if Mr. Wolnik would like to respond to that, as his area is northern Ontario and there is a lot of opportunity up there as well.

Mr. Wolnik: I think I will echo Mr. Safrance's comments.

Mrs. Sullivan: I have a supplementary on that. Basically, you see buyback rates as an incentive for cogeneration. What other kinds of incentives might also be attractive in lieu of incentives that only come through rates?

Mr. Pinnington: Just on terminology, I do not think we look upon the buyback rate as an incentive.

Mrs. Sullivan: If it were at a substantially higher level than it is now, that would itself be an incentive, I would think.

Mr. Pinnington: We are looking for a realistic cost-based rate, and the word "incentive" sounds to me like somebody throwing something into the pot. We are not looking for anything special.

Mrs. Sullivan: A spur, then; I will change the word. Are there other approaches that might also be attractive in terms of encouraging cogeneration, like low-interest loans?

Mr. Pinnington: I am sure there are opportunities for the government to participate, for example, through the various development incentive programs it has, which would be an incentive. That would certainly be helpful.

I would also suggest to you just fairly and simply the policy thrust. Certainly the Minister of Energy (Mr Wong) has been very positive about cogeneration and private power. He has been very supportive, and that is an immense incentive to us to have the government be foursquare behind independent power production.

Mr. Safrance: Your suggestion on low-interest loans by, say, Ontario Hydro is interesting. That sounds good, but it defeats one of the purposes of independent generation: it does not increase the debt of Ontario Hydro or the province itself. The individual who is proposing the plant would take a look at the interest costs of loans that he himself would–

Mr. Passmore: The intent of my question, actually, was not to suggest that six cents was some kind of incentive rate but that the consultant yesterday was saying that could reflect a real value of power at the margin.

Mr. Safrance: To answer your question, I think that would create interest in Ontario.

Mr. Passmore: A supplementary to Mrs. Sullivan's supplementary, however, is this question of programs versus policy. I rather suspect that you would prefer a policy environment rather than government programs aimed at encouraging cogeneration. Would that be correct?

Mr. Safrance: That would be my attitude.

Mr. Passmore: My last question relates to the question of efficiency. There has been some talk about efficiency improvements, that cogeneration offers that and that there is a heck of a l happening in the US. In a free trade environmen what is going to happen as far as Canadia industry's competitiveness is concerned if U industry is heavily into cogeneration and Canad an industry is not, in view of energy being component in the cost of the final product you a producing?

1700

Mr. Pinnington: That is a very gener question.

Mr. Cornelson: You will probably get fiv different answers.

Mr. Pinnington: Mr. Otsason, do you want have a go at that?

Mr. Otsason: I get to start, do I? I think alluded to it in the presentation, that cogeneratio is one way for industry to reduce its energy co overall, both thermal energy and electricity. It also a way of building in some stability an having some control over that. I think it certainl is something that would help Ontario industrie at least put them on the same footing as the competitors south of the border or give them a le up if they go the cogeneration route and the competitors down south have not. It is obviousl not the only factor that affects the competitiv situation, but I think it could only work in the favour.

Mr. Cornelson: Quite apart from free trade, is very important in a competitive environment keep your cost structure as low as possible. It just critically important. We are certainly reali ing that in the oil and gas sector these days because of where our prices have gone in both o and gas. It is hard for me to really relate that to situation where you have Ontario Hydro as crown corporation perhaps not fully reflectin the true costs in its rate design.

Again, I am not an expert on that, but I woul certainly think that the efficiency side of it ha got to help keep Canadian industries on an equ footing with their US counterparts, and th would be very positive for Canadian industry in free trade environment.

The Vice-Chairman: I have a questio myself in the realm of efficiency and the prope use of resources and so on. What are the relativ merits of turning natural gas into electric powe and putting it on to a distribution system that ha to be increased–with load increases you have t increase the distribution system–when you al ready have a pretty good distribution in place fc gas? Just to help me along, what percentage c

he consuming market is covered by distribution nes now in Ontario? Just a rough figure.

Mr. Safrance: In our own franchise there is onsumers Gas, which is in central Ontario, asically. I think we are up over 80 per cent.

Mr. Wolnik: In the ICG Utilities area overing northern Ontario and northwestern ntario it is about 65 per cent.

Mr. Pinnington: I would suspect the Union as area is probably in the same order of agnitude as Consumers Gas, probably 80 per ent or higher.

The Vice-Chairman: For the sake of argu-ent, I might say that for Ontario, something in e neighbourhood of 75 per cent is covered with e distribution system. Looking at the tremen-ous advances in gas heating efficiency units–ome of them made now in my riding in Tilbury et as high as 96 per cent–would it not be better erhaps to look at the direct use of gas in a home here you might have a small turbine that both eated the home and provided the electricity for e home or where you use water heating to heat e water and the home as well?

I guess what I have in mind is that not too far own the road we are going to need natural gas or propelling vehicles rather than liquid fuel. What do you think about using gas directly rather han through the Hydro system of promoting that nd perhaps some help from government?

Mr. Pinnington: The reality is that natural gas ertainly heats our homes at this point in time and substantial number of people cook with it. We ry our clothes with it. We heat water with it. here is a sizeable project across Ontario now for ome compressors so that you can fill your omestic automobile at home. I think we are radually getting to where you are suggesting.

The one item we do not have at this immediate oint in time is the small electric power generator or the home, but researchers are looking at hings like fuel cells, for example, that might ltimately be used in that area. These are echnologies that are down the road. They are not vailable and not cost effective at this immediate oint in time, but it would not surprise me in the east in our lifetime if we see those things. Do ou have anything?

Mr. Otsason: I was just going to add that eally what we are talking about when we talk bout the modulatory of gas-fired cogeneration is hat you can generate electricity at the point of se so that you avoid the inefficiencies associated vith transmitting the electricity. Right now, it is eally primarily looking economical at a larger scale in industries and industrial plants to do it onsite. In the United States there are a lot of commercial applications where that has been found to be viable. Hospitals, old schools, McDonald's outlets and those kinds of situations are workable down there and are being installed.

There is some equipment, as Mr. Pinnington mentioned, that is being developed and some available that is residential size, that is, the size that you might use in a house. At this point in time, the economics are not there yet, but it is certainly an area in which there is both research and development activity going on to develop better equipment, and experience certainly leads one to believe that is a possibility further down the road.

Mr. Safrance: Mr. Chairman, perhaps you had another part to that question too, and that is, why do we not keep the resource we have for direct use? That was part of it.

The Vice-Chairman: Yes, that is in my mind too.

Mr. Safrance: I think the answer to that is, as you saw, there are huge potential reserves in western Canada. I think the border is opening up relative to trade and if Canada does not use Canadian gas, the Americans will.

Mr. Cornelson: Could I just add one other comment; I should have brought this up in response to earlier questions as well. When it comes to the price of natural gas, one thing that will help keep the lid on natural gas prices are crude oil prices because a very large portion of the natural gas market is substitutible with fuel oil. We do not expect crude oil prices to increase much at all until the mid-1990s, unfortunately. So I do not think we are going to need natural gas for use in automobiles to a large extent. It probably has its place, but I just do not think there is going to be an urgent need for it as a direct fuel.

Mr. Passmore: I just have one quick wrapup question for Mr. Cornelson. Would you foresee the opportunity, given increased cogeneration in Ontario and increased involvement on the part of western gas producers in the cogeneration market in Ontario, for an ongoing and increasingly amicable relationship between Ontario and Alberta?

Mr. Cornelson: I think so. I think we as producers in western Canada are motivated primarily now by the need to build markets. We have a surplus of gas that was built up because of volume and price regulation in the past. We would love to build new markets in Ontario. Historically, we have been under the impression

that growth here was pretty limited and therefore we had an incentive to look south for incremental growth. But if you can develop a basis to provide incremental growth here, it might be a lot simpler.

The Vice-Chairman: Thank you very much, gentlemen. It has been a very enlightening presentation. Thank you for coming.

Mr. Pinnington: Mr. Chairman, may I just add one item. The question of the province of Alberta's policy regarding the use of natural gas and coal and electric power generation was raised. The Ontario Natural Gas Association has written the Alberta Minister of Energy and asked for clarification of that item. We expect a positive response from him shortly, and I will see that the committee gets a copy of that letter when it arrives.

1710

The Vice-Chairman: Thank you very much. Our next presenter is Phillip Otness, executive director of the New England Power Pool. Welcome to our committee.

NEW ENGLAND POWER POOL

Mr. Otness: Good afternoon. It is a pleasure to be here.

I have given the clerk copies of my presentation. I do not intend to read it here unless you want me to do so. I suggest that I could summarize the different sections. I am a very informal speaker. We could discuss them as we go along in those subject patterns if you want and then take any other general questions at the end or however you would like to proceed.

The Vice-Chairman: Since it is short, and we have just received it now, so we have not had a chance to read it–

Mr. Otness: I know you have not read it.

The Vice-Chairman: Perhaps if you would follow through, it would be helpful.

Mr. Otness: Okay, that would be fine. It is a pleasure to be here to represent all of the utilities in New England.

The New England Power Pool is a voluntary association of virtually all of the electric utilities in the six New England states. We were formed after the blackouts in 1967, and we were formed by 1971. We finished our negotiations and most of the major utilities, both private and public, investor-owned utilities are in the pool. That includes the co-ops and the villages in Vermont. Every utility that is in the distribution business can join the pool.

Our primary function is to plan, co-ordina monitor and direct the operations of the ma generation and transmission system. We plan and serve the electrical requirements as integrated system. As I said, we have more t 99.5 per cent of the production capacity transmission in the system.

The objective of the pool is very simple– want to increase the reliability and the econo of the system.

Power pooling occurs whenever independ utilities join together to examine their joint ne and resources and agree to plan and operate th facilities for the best achievable combi reliability and economy.

We became a reality in 1971, when we star our combined dispatch. It was really started several principal utilities, but soon every joined the agreement. We still have a few sn utilities that are joining that have been in the p as total requirements, customers of other utili in the pool.

To assure the maximum benefits of po pooling, the electric facilities of all the mem companies are operated by NEPOOL as if t comprised a single power system. We acc plish this by the central dispatch of po supplies, utilizing the lowest-cost generating transmission equipment available at any parti lar time.

The value of the energy savings we h achieved over the lifetime of the pool, the last years, has been well over $500 million.

Through shared operating reserves and ordinated maintenance scheduling, we can prove the reliability of the power syste Co-ordinated generator and transmission main nance scheduling increases the reliability reducing the risk of multiple outages and res in more customer demand being served by existing or equal amount of generation. We serve more load. This has become particul important during the last few years, as our ra load growth in New England has virtu eliminated any surplus generation during alm all parts of the year and especially in the sum and winter. We are a dual-peaking system have to face several months of peaks during b the winter and the summer seasons.

By pooling the generating reserves, we able to supply replacement power whe member utility plant shuts down unexpectedl forced outage–thus preventing a loss to utility's customers. Because of this regi reserve margin, the power pool is able to cove largest single contingency, that contingenc

y particularly large generating plant or transission line. Clearly, it would be very costly for individual utility to invest or insure itself, so to eak, to meet such a reliability contingency on own.

If I can speak for a minute about interregional s, New England Power Pool also lowers ectricity costs in New England through transission interconnections with our neighbours, incipally the power pools of the New York ower Pool, Hydro-Québec and New Brunswick ower in Canada.

Interties with these adjacent systems allows us take advantage of regional diversities and fferences in customer demand for electricity in ose areas, as compared to our own. This added versity allows us to purchase more economical ergy. We generally mean economical energy the hour or by the day or by the week, pending on the situation in the adjacent power stem. We substitute that for what could be oduced at that time in New England.

Interconnections from our neighbouring pow- systems also contribute to greater reliability cause the transmission interties enable the joining systems, as well as our own, to arrange r either purchases or sales of emergency power om either power pool, if the need arises. ertainly in the past few years, as all the power stems in the greater northeast have reached eir limits, we have shared emergency power in l directions, I think, in the greater northeast.

Through the interregional transmission links, oled resources, shared reserves and central spatch, NEPOOL and its member utilities ovide New England with one of the most phisticated power systems in the world.

Load growth and fuel mix: I mentioned that EPOOL is both a winter- and a summer-aking pool. The winter peak we established is January at about 19,300 megawatts on nuary 14. We reached last month an all-time stem peak of 19,500 megawatts on August 11. EPOOL's 1988 summer peak represents an ght per cent increase over the peak demand of e previous summer in 1987.

According to the power pool's forecast–we t out an annual, long-range forecast every ar–New England is trending towards becomg a summer-peaking region. The summer peak projected to grow at an annual rate of about two r cent through the next 15 years.

The total load served by NEPOOL during 87 was about 104 million megawatt-hours, or rawatt-hours, as you might call them–a 5.3 per nt increase over the load of 1986. During the most recent 12-month period, however, NEPOOL energy requirements have continued to grow, rising to 109 million megawatt-hours, a 5.6 per cent increase compared to the same period a year ago.

In the last five years we have grown by a total of almost 30 per cent. That adds up to an annual compound rate of about 4.5 per cent, one of the highest growth rates in the United States. We still, however, expect a long-term growth of about 2.1 per cent annually.

The 1987 NEPOOL fuel mix for the production of electric energy was: nuclear, about 28 per cent; coal, about 16 per cent; oil, about 32 per cent; purchases from others, about 14 per cent. Hydro and natural gas each represented about five per cent.

Canadian purchases: the Canadian provinces have been very valuable energy partners to us in the region since our inception. New England utilities have long recognized that there are a number of advantages associated with electricity imports from Canada. The principal advantages are the added economy and the fuel diversity that they provide to NEPOOL's energy mix.

Much of the electricity purchased from power systems in Canada allows NEPOOL to displace a portion of the more expensive fossil fuel resources that we would otherwise be burning to serve our loads in New England. Helping to reduce New England's dependence on residual oil which currently makes up more than 30 per cent of the region's power generation is a major benefit of the Canadian purchases.

There is also a diversity of contract arrangements existing between NEPOOL members and Canadian utilities. The bulk of the electricity purchased from Canada, at least in the last couple of years, is delivered in the form of hourly economy energy or daily economy energy. It is both economical and available during much of the year because, as you know, Hydro-Quebec, New Brunswick and Ontario, too, are principally winter-peaking systems so they often have surplus during the rest of the year.

The reliability of the Canadian energy imports has been excellent and very helpful to NEPOOL, especially during our summer-peaking season. In 1987 economy energy purchases from Canada amounted to nearly 5.8 million megawatt-hours and provided about 5.5 per cent of NEPOOL's total electric energy requirements. More than $42 million was saved by us in New England through these economy purchases from Canada.

In addition, individual NEPOOL members have firm power arrangements with Canadian utilities. These include New Brunswick Electric Power Commission, Ontario Hydro and Hydro-Québec. These purchases are credited toward the NEPOOL member's capability responsibility, that is, to meet its obligations to the pool, the same way as any generating plant would provide for it within the region. Many of these firm purchases have varied from month to month but we have averaged about 800 megawatts of firm capacity purchases during the last year. This has provided more than five per cent of NEPOOL's energy. These firm power contracts are important to NEPOOL because of the increasingly tight capacity situation the region has experienced in the past five years.

For the future, NEPOOL is in the process of expanding one of its existing Canadian energy partnerships. NEPOOL and New England utilities have entered into a firm energy contract with Hydro-Québec which will commence in 1990 and extend to the year 2000. The firm energy contract and associated transmission facilities will allow NEPOOL to increase the capacity of its existing interconnection with Hydro-Québec from 690 megawatts to 2,000 megawatts. We refer to this as the phase 2 project. This will permit the transfer of an additional seven million megawatt-hours annually to New England during the 10-year contract period.

In addition, individual New England utilities are either negotiating or have already completed negotiations for further purchases from Canadian utilities. Boston Edison Co. is working with Nova Scotia to evaluate the feasibility of building an underwater cable directly to Massachusetts under the ocean from the province to south of Boston on the east coast of Massachusetts. Central Maine Power has already agreed on a long-term firm power purchase from Hydro-Québec and would build an interconnection in Maine with Hydro-Québec. The Vermont utilities have just recently signed a long-term firm energy contract which would utilize existing interconnections to bring that firm energy into Vermont.

In summary, the New England utilities continue to add generation as well as to invest in demand-side options to meet the growing demand spurred by our region's booming economy. Purchases from outside the power pool, both in Canada and domestically to the west, are vital sources of supply now and will continue to make a significant contribution to resource adequacy and especially our energy diversity.

I would be happy to answer any questions. have also given the clerk a few copies of o annual report which has a lot of statistics that ma be of interest as you are completing your researc and moving forward.

Mr. Runciman: You talk about energ diversity and purchases from outside the poo Do you have a target or ceiling in mind of wh percentage you would not wish to go beyond terms of the supply from outside your ow jurisdiction?

Mr. Otness: We have not made a polic determination in New England on that but I wi give you my personal opinion. As long as we c not exceed the amount of imported oil or excee the amount of reliance on other single fuels types of plants, I certainly do not get uneas Practically speaking, it will be a monstrous tas to increase our dependence on Canada more tha about five per cent each decade because you ju cannot build the transmission lines that a required through the distances that are require It is somewhat self-limiting. We are probab about 10 per cent dependent on contracts ar energy from Canada now and maybe 15 per ce when we get phase 2 on line in the early 1990s. do not see that that can increase by leaps ar bounds over the next decade or even tw decades.

Mr. Runciman: You are looking at th primarily to offset imports of foreign oil, so yo are not looking at it as an alternative to havir additional generating capacity.

Mr. Otness: Yes, we are. Let me explain th a little. In the last few years we have looked at as a substitution for foreign oil. That was main a result of the negotiations, of Hydro-Québe having a huge surplus that it was going to take 20 years to grow into instead of the five or seve it assumed when it built the James Bay projec We negotiated on that basis, because we did n need capacity and did not to build the addition generating plants in New England, but there wa a benefit, to displace fossil fuel that wou otherwise be burned in existing plants.

Looking towards the future, the contracts have just talked about in the last paragraph ther that Central Maine Power Co. and Vermo Yankee Nuclear Power Corp. and even Bosto Edison are looking at, would be of a differe type. They would be to substitute for generatio that would otherwise have to be built in the 199 in New England. I think there is a feeling in Ne England that we have to do some of both, that v have to build some generation and that certain

ne purchases from others to the north, ecially if they add diversity, are good.

Mr. Runciman: You are not having any rnal difficulties with that in respect to the jobs t might be created through the construction se and the operation phase within your own sdictions?

Mr. Otness: There has been very little in New gland. I think that is principally because rybody is employed there now. There have n some discussions by unions and others, but long as we build some projects in New gland and keep those people as busy as they w are, I do not think that is a problem. Most of discussion that we have heard, and I am sure have heard that same discussion, is from the l-producing areas to the west. We would love have the cheap coal-fired power from them , but the transmission is even longer and more ensive than to build from Ontario, Hydro-ébec or New Brunswick.

Mr. Runciman: It ruins your lakes as well. You talked about economy energy and your rchases from Hydro-Québec. You mentioned 87, but you did not mention 1988 when you ked about your peak in the summer. Of course, ryone experienced those summer peaks in 88.

Mr. Otness: Yes, we did.

Mr. Runciman: Did you have any problems terms of the availability of economy energy s past summer?

Mr. Otness: We certainly did during the times the peak. Economy energy was not available the greater northeast, but that was only a few zens of hours, let's say, out of a very long mmer. Throughout most of the summer, we ed a great deal of economy, but certainly you right. During the 10 or 12 days when we perienced substantial problems serving our ak, we had to go into voltage reduction in parts our system, as many as 10 times, and go to blic appeals for voluntary curtailment over dio and TV, as many as eight times in parts of r system and at least once throughout the stem. Certainly, economy was not available in ose hours and during those days.

Mr. Runciman: You suffered no brownouts blackouts from it?

Mr. Otness: No. There were no firm customs that were dropped or that had to experience tages. We curtailed interruptible sales and got ry good reaction from our public when we ked it to cut back, because we just could not rve the load. We certainly would have had a peak substantially above 19,500 if we had had the generation to serve it.

Mr. Runciman: How does the purchase price of economy energy stack up against your own energy produced in your own constituencies?

Mr. Otness: Generally, power pools sell economy energy by splitting the savings; that is, every hour when we dispatch our generation, our pool co-ordinators or dispatchers, as you might call them, will compare with the neighbouring province. If our next segment of generation might cost three cents per kilowatt-hour–that is just the operating cost–and if we can buy it from the New York power pool at 2.5 cents, then we will buy it and split the savings, so that we actually buy it in this instance at 2.75 cents. They save a quarter of a cent and we save a quarter of a cent on every kilowatt-hour that is thereby sold.

Mr. Runciman: You have the same arrangement with Hydro-Québec?

Mr. Otness: No, we do not. We do with New Brunswick. Hydro-Québec, because of our phase 1 agreements, is a little bit different. The major amount of the energy is on 80 per cent of our average annual fossil fuel cost. During many of the hours, that would amount to about the same price. Sometimes it is cheaper and sometimes it is more expensive. You can see that as the daily dispatch goes through the cycle of a day, the Hydro-Québec economy through that arrangement would be very steady.

1730

Right now, our average fossil fuel cost is about $24 per megawatt-hour. That is what we usually dispatch in, and that would be 2.4 cents per kilowatt hour or 24 mills.

Mr. Runciman: Who arrives at this? This is a decision. You determine this average price, and it is communicated.

Mr. Otness: We determine it monthly and we communicate it to them. That is correct. Most of their sales to us in the past 12 months have been around two cents per kilowatt hour–80 per cent of 2.4 cents.

Mr. Runciman: You are purchasing how much from them on an annual basis now under your current contract?

Mr. Otness: We have been averaging about five terawatt-hours, and some from New Brunswick too, which I included in the five per cent I talked about here.

Mr. Runciman: Does their price work out to about the same, two cents a kilowatt hour roughly?

Mr. Otness: Yes, or we would not be buying it. New Brunswick's floats with the hour, the same as New York's. Of course, our increment is changing every hour, our next segment of generation.

Mr. Runciman: You said you also buy power from Ontario Hydro. How does your price structure work with Ontario Hydro? Is it comparable to the Hydro-Québec situation?

Mr. Otness: No. Since we are not interconnected directly with Ontario Hydro, we cannot exchange economy. The only contract that I am aware of in the last few years has been a contract of Vermont state. They have bought some firm capacity from Ontario Hydro. That is priced like firm energy would be, with a capacity and an energy charge. Just how much that is, I am not sure. It is around 80 megawatts presently, I believe.

Mr. Runciman: Just as a ballpark guess, what would that be?

Mr. Otness: I would not even want to guess because it is a firm source. I do not want to mix that up with talking about economy. We both buy and sell to New York, and you understand that it is both buying and selling with Ontario. Certainly some of that energy gets to us in one form or the other and, obviously, gets to you from us, but it is indistinguishable because New York Power Pool would blend it with its resources and sell a remainder.

Mrs. LeBourdais: I was just wondering, since you mentioned that you were formed in 1971 as a result of the blackouts, etc., would the pooling of the various power resources now totally eliminate that possibility happening again or just reduce it severely?

Mr. Otness: It would definitely just reduce it. There is always the possibility of a blackout. You cannot eliminate that possibility, but we certainly hope we have reduced the probability of that to a very low level. We certainly think that system is working.

Mrs. LeBourdais: Okay. I am sorry, I believe Mr. Runciman did ask this and I did not quite hear. Do you presently buy any power from Ontario?

Mr. Otness: One of our utility groups does in the state of Vermont. They have a contract with Ontario Hydro and they have arranged for transmission through the New York Power Authority through New York to get it to the Lake Champlain area.

Mrs. LeBourdais: I see. Without getting into a long answer on this, I am just wondering, from your particular perspective, in the light of approaching free trade agreement, whether feel any joy or sorrow at the possibilities of h that will impact on the future purchases of pow particularly from Ontario.

Mr. Otness: I certainly think it is g because I think it will allow more exchan between the neighbouring utilities. I certai feel that we are a neighbour of Ontario, beca we are very close and we are both members in Northeast Power Co-ordinating Council. main thing it does is it cuts down on the licens time. If a firm contract can be written betw two utilities or two pools for six months or months, it can save capacity and it can provid firm assist to that area in need and, as we forward, who knows who is going to grow fas or slower in certain years or certain weat periods? I think it is a very large benefit to al us.

Mrs. LeBourdais: But you are not concer over the qualifier of provincial agreement to ahead with that? Even though the fede government may be saying that it is giving the ahead, it must have provincial approval. T does not concern you?

Mr. Otness: No, I do not think so because of your utilities are really representing province and we have never had a problem w the provincial governments in the past.

Mr. Brown: Thank you for coming. The f thing that strikes me is that the power pool roughly the same size as Ontario Hydro in ter of capacity.

Mr. Otness: Yes, it is.

Mr. Brown: What kind of reserve capacity you believe is necessary in your system? talked of 22 per cent or 23 per cent he something like that.

Mr. Otness: We are very similar. Of cour your reserve percentage is dependent on seve factors that go into that study and we use the sa criteria Ontario Hydro does and that all of neighbouring power pools do, and that is the c chance, the one time in 10 years that we wo lose a firm customer and not be able to sup him from either generation or transmission.

Was there a second part to your question?

Mr. Brown: I think I stuck with one fo change.

Mr. Otness: Okay. Our reserves are alm identical. With the composition of the size of units that we have on our system and the size our system, right now our reserves recommenc for this year are 22.3 per cent, and we range fr

per cent to about 26 per cent as we look into future.

Mr. Brown: One of the reasons I asked that estion was that it appears you have a more ersified mix of power than we do.

Mr. Otness: Of fuel?

Mr. Brown: Yes, of fuels. I wondered if in ur case it would reduce the amount of reserve u thought you needed.

Mr. Otness: No. The fuel would not have as ich of a bearing on the percentage of reserves the size of the units, physically, and how many those large units you had, unless you had the dro where you were running out of stream flow certain times of the year.

Mr. Brown: On a different topic, we have had reat discussion here over the last while about remental avoided costs, what really they are d how that relates to cogeneration and a lot of things we are trying to encourage, and it ems to be dependent on a number, what that lly is. Obviously, you also have been promot- cogeneration and that sort of thing. Could u give me a little bit of your experience on this?

Mr. Otness: Yes, although you must under- nd that with six separate states, six separate vernors, energy departments and regulatory mmissions, each has gone somewhat its own y. But let me tell you how they have solved me of the problems I heard you discussing in last hour.

Each of the utilities under our pool has to ovide its own generation by contracting, rchasing or constructing it. The states, espe- lly the regulators, have encouraged purchases m nonutility sources, and over the last five ars, we have accumulated about 800 mega- tts. That would be about four per cent of our nerating capacity from nonutility generators d that is mostly in the last, say, three years and nost half of that 800 in the last one year, from erything from refuge plants to some coal but a of natural gas and a small amount of small dro.

What they have turned to now in order to set prices is a bidding system, because originally ces were set on a trial basis by several of the gulatory commissions and, as the fuel prices anged, it has not worked out very well; we ve found we have paid much too much for me of the power that could otherwise be nerated. In other words, if a utility needs 200 egawatts in 1993, it goes out to bid. It may give nus points for diversity or clean air or garbage if it has gone through that with its regulators and feels that is a social or a public need.

1740

Generally, it is just based on economics. Certainly, natural gas is a very strong and aggressive bidder to fill most of that need. We are very concerned in New England that being on the end of the pipeline from both Canadian gas and our own southwest gas that we are not going to have as much gas as everyone is planning on to run electric utility generation. But bidding seems to be the answer.

Mr. Brown: Give me an idea of what number they started at.

Mr. Otness: Oh gosh, I would not even attempt to do that because there are so many auctions going on. It depends on the time period. I know I was thinking, as you were asking that last question, that certainly the coal plants are more expensive than natural gas, but the crossover is, from what I have seen, probably crossing over in about five, seven or nine years because of the less capital for the gas combined cycle projects as compared with the coal plants. But then you have more fuel costs and more escalation.

Mr. Brown: Shifting gears again, noting your fuel mix, you have a reasonable amount–16 per cent coal, 32 per cent oil, which at least in this jurisdiction is considered probably not the best from an environmental point of view. Seeing as we are encouraged by the fact that both presidential candidates are making noises about acid rain control and what not, it would seem to me, if they happen to be serious, which we are hoping, that it could create severe problems for your utilities very quickly.

Mr. Otness: Let me answer it this way. The reason we are so dependent on oil is because of the last generation or two. The environmental rules made us change all of our plants that used to be coal. Some that we were building in the 1960s and early 1970s were built for coal and started up on oil. So we shifted to oil.

Now we have made some of the cycle to go back and convert some of them back to coal. We are trying to put in a lot of dual fuel now so that some of those same plants and others can be repowered with gas or burn gas. That helps environmentally, but most of our oil plants are fairly clean burning. Of course, those that are going back to coal are putting in not scrubbers, but emission controls so that they are finding out that they can burn coal as cleanly as oil.

Regardless of what generation we use to extend the lives of our plants or to build new plants, I think we have the technology to make it cleaner than we have in the past. I would not favour necessarily or eliminate any one particular fuel because of what has happened in the past. The technology is here to burn any of them cleanly. We are more dependent on oil than we would like to be, though.

Mr. Brown: It intrigues me that with six states involved and about the same amount of power being generated and needed as Ontario, how in the world do you go through a process as we are going through right now? Is it done by the pool or is it done by the individual state? You alluded to regulatory boards, I guess, in every state.

Mr. Otness: Yes.

Mr. Brown: And if you have, what are they recommending?

Mr. Otness: Unfortunately, we have not gone through a decision analysis or strategic planning as I think you going through. We have had, however, over the past several years, the governors' conference group which has taken a very large interest in our energy future. Starting several years ago, they put together a power planning committee which is composed of the chairman of the regulatory commission of each of the states, and the energy czar–whatever they call him, something different in every state–or the energy secretary.

Those 12 people do meet. We communicate with them regularly and often, even though they do not have any regulatory authority over us because we are actually, as a pool, regulated by the Federal Energy Regulatory Commission. We work very closely with that power planning committee of the six states and we have been able to move forward with a lot of accords and agreements. We certainly have our arguments, and certainly the pool was originated with virtually no interest of the states. It worked very well with just the utilities arguing and coming to consensus over different policies because, after all, our electric system knew no state border.

We still put together an econometric forecast for New England without regard to the states or the individual utilities. Then we break it down later to the individual service areas of the utilities. We have planned for a long time on the basis of the total of New England, and I think it has worked pretty well. But now, of course, as you are aware, there is a lot of interest in the energy future of our country. By "country," I meant broader than the United States. I meant the whole of North America, I guess, because we are all working together, especially economically the northeast we are a very compact unit, I thi

Mrs. Grier: I am curious about the f contract that you mentioned between Ontario Vermont. Do you have any idea of the t period of that contract?

Mr. Otness: Yes, five years, I believe. A contract was discussed and written, I beli about a year ago. It has some options to va small amount as they go forward.

Mrs. Grier: But it is not an interrupt contract.

Mr. Otness: No. It is a firm contract.

The Vice-Chairman: One of our consulta Dave Argue, has a question.

Mr. Argue: I have a couple of questions, first with regard to the reliability question.

Some question has been raised about reliability of long-term purchases from Hy Québec, for example. It is one of the opt being considered by Ontario Hydro under strategic principles. One of the things that been suggested is that at any time Hydro-Qu sells any significant portion of electricity, on a short-term basis, it needs to isolate the p to interconnect it with the Ontario system. wondering how the pool has dealt with t sorts of issues with Hydro-Québec.

Mr. Otness: That is right. All of the m neighbours of Hydro-Québec have to inter nect with Hydro-Québec with DC intercon tions. Even though we circle around them, w operate in synchronous. We cannot with Hy Québec because of its particular system de and that originates from the fact that its hydro plants are so far from its metropo areas.

We have had to build DC interconnect and that is the major reason why New Eng was never interconnected with Hydro-Qu for many more years than was realistic, I g There was a very small amount of Vermont that was actually switched on to the H Québec system in the Northeast Kingdom as they call it. But our first interconnection only two and a half years ago, the small o Vermont, 200 megawatts, followed by 690-megawatt phase one project, which interconnected almost two years ago now. T were our first interconnections.

We received energy from Hydro-Qu through the New York Power Pool as a secor economy, you might say, and also through Brunswick, because they were both inte nected long before we were.

Vr. **Argue:** But you do not see a problem at for long-term purchases with regard to the ability of Hydro-Québec because of those que situations?

Vr. **Otness:** No. I do not know how complex u want to get. We do see a problem because, if of the neighbouring systems to Hydro-Québec ould suddenly be without their firm purchases m Hydro-Québec, it causes a major problem ough the Pennsylvania-New Jersey-Maryland erconnection system, through Pennsylvania d New Jersey, as the rush of power comes from rest of the continent to fill that black void.

Right now we are limited to 2,200 megawatts. r new interconnection will be isolated from ir system, so that will not count in the 2,200 gawatts. Further, Hydro-Québec is upgrading criteria of the standards of its system to pass test that we mutually pass with each other, so t its system will be as reliable as ours, even ough we still cannot interconnect with it. They pect to spend almost $1 billion on improve-nts to make that happen by the early 1990s. I nk that problem is going away.

50

If we look at that electrical problem as solved, n I do not have a problem with what you said, t the source of supply from Hydro-Québec ould be just as reliable as any other source, ybe more so, because it is a very large system. u are really buying it from a diverse collection hydro generation rather than single stations t we would build, for instance, if we were to t that same, equivalent constructed generation our own system.

Mr. Argue: Switching topics from the techni- side of the issues to a question of the onomic advantages or disadvantages of pur- asing, I note in your presentation that in 1987, per cent of the NEPOOL fuel mix was through rchases. Suggestions have been made before s committee that entering into such significant rchases from outside Ontario is really export- g jobs and economic activity to other areas.

I would like your reaction to that sort of estion and to the question of how, for example, people at the political level in the New gland area react to this question of basically nsferring economic activity into other jurisdic- ns?

Mr. Otness: Sure. Let me answer that in two ys now. When I said 14 per cent, that was the rcentage of energy and a lot of that energy was urly or daily economy energy. That is lower- g the energy price in New England and creating jobs, because we were not dependent on buying that. Let's say, out of the 14 per cent offhand maybe about half of it was economy. That is not a dependence; it is just that when we could buy it cheaper from New York or from you, we would do so. That makes jobs in our area so our merchants can compete.

With regard to the other part, yes, it could possibly take away jobs if you are considering the construction and operation of the power plants. On the other hand, if you can buy it cheaper, it still takes operation of your power system, additional transmission lines and substations to bring it down, so it is not a complete saving of operating people.

On the other hand, if you can lower your electricity price over the long term by doing some of that diversity, that might be good. Call it an insurance policy. I guess we would rather pay a little insurance with Hydro-Québec than be at the mercy of the Organization of Petroleum Exporting Countries oil and have what has happened in the past, in 1973 and 1979, occur again and have too much dependency on OPEC oil.

We were about 65 per cent dependent on oil during the 1978-79 period, so our objective over the last decade has been to reduce that dependence, and even though the statement was that 32 per cent seems like a lot of dependence, it depends on your background. When you were at 65, it sounds pretty good. We would still like it lower, and we hope to get it down as low as 20 per cent with the projects we have slated to come on line in the early 1990s, the Hydro-Québec, and if we can get Seabrook and Pilgrim on line, it could go as low as 20. There, again, it depends on load growth too.

Mr. Argue: I have one final question. It refers to your discussion of forecasted growth rate. Just to read back into the record, "NEPOOL's 1988 summer peak represents an eight per cent increase over the peak demand of the previous summer." At the end of that paragraph, you are predicting "an annual rate of growth of 2.1 per cent through 2003."

There has been a great deal of discussion over the past few days before this committee in saying, "Look what has happened over the last two or three years with regard to growth rates." I was wondering if you could just give a short background to why NEPOOL is projecting a growth rate of 2.1 per cent through to the year 2003.

Mr. Otness: The 2.1 per cent now is a long-term average annual compounded rate. It should not be confused with any specific year in

that period. Generally speaking, the economic and demographic input that we get from others–we do not originate it–shows that our load growth is stronger in the near term and then tails off by the end of the century to even slower than the two per cent. So it is greater than the two per cent in the near term and much less in the long term. We still think that is a reasonable forecast for the long term.

In the short term, I think, for this last year, even though we saw a little over five per cent, we had forecast 3.5 to four per cent. In a lot of our forecast we have missed in the near term because we have not had the rate increases we expected to see. We expected to see some large rate increases when we got two major nuclear units on line, Millstone 3 and Seabrook.

Of course, you are probably aware that we have not been able to get Seabrook on line, so there have certainly been no rate increases. Millstone 3 was not allowed the rate increases. It was phased in over five years, so we have had a real price reduction for almost five or six years now.

The Vice-Chairman: One final question, which is sort of on the margin of what we have been talking about. What interested me was when you were talking about the economy booming in the New England states. Not many years ago we heard about how industry was rushing away, going down to the Sunbelt and so on, the greying of the older industry. I wonder if in just a few words you can tell us what has happened in New England.

Mr. Otness: I think it is a collection of a segments of our society. Our service indus are strong. The colleges are strong, as is manufacturing. We do not have the h industrial manufacturing that is characterist much of the rest of the US and Canada, but i very diversified economy. I guess, with national economy and the Canadian econon it has been, we have been blessed with a strong and robust situation.

The Vice-Chairman: When you lost one of industry, others rushed in and took its pl

Mr. Otness: I would not say they rushed have only been there for 10 years, having from the other coast, but certainly there has a big turnaround. Instead of major indus New England was known for the leather and manufacturing industries and so forth.

I am sure we have a few like Reebok sl which has done fantastically, but it is a diff era. Certainly the service industries and esp ly the financial industries have really contr ed.

The Vice-Chairman: Thank you very n It is six o'clock. We usually stop earlier tha Perhaps that is not true either.

Mr. Otness: It has been a pleasure. Than very much for inviting me. We will look fo to your results, whenever they might be.

The Vice-Chairman: We will meet tomo at our usual hour, 10 a.m.

The committee adjourned at 6 p.m.

CONTENTS

Wednesday, September 21, 1988

SELECT COMMITTEE ON ENERGY

irman: Carrothers, Douglas A. (Oakville South L)
e-Chairman: McGuigan, James F. (Essex-Kent L)
wn, Michael A. (Algoma-Manitoulin L)
rlton, Brian A. (Hamilton Mountain NDP)
eatz, Sam L. (Durham East PC)
er, Ruth A. (Etobicoke-Lakeshore NDP)
rundola, Gino (Willowdale L)
, Michael C. (Windsor-Walkerville L)
iciman, Robert W. (Leeds-Grenville PC)
th, Larry (Frontenac-Addington L)
ivan, Barbara (Halton Centre L)

stitutions:
ourdais, Linda (Etobicoke West L) for Mr. South
usella, Tony (Dovercourt L) for Mr Matrundola

rk: Manikel, Tannis

ff:
ue, David, Consultant; with Passmore Associates International
smore, Jeff, Consultant; President, Passmore Associates International
ger, Lewis, Research Officer, Legislative Research Service

nesses:

m JBS Energy Inc.:
cus, William B., Principal Economist

m Orillia Water, Light and Power Commission:
hurst, Ray F., General Manager and Secretary-Treasurer

m Nirabro Industries:
hardson, Tim

m Ontario Natural Gas Association:
hington, Paul E., President
ason, Juri, Manager, Industrial-Commercial Marketing
ance, Charles S., Chairman of the Board; Senior Vice-President, Operations, Consumers Gas Co. Ltd.
nelson, Dennis W., Vice-President, Marketing, AEC Oil and Gas Co.
lnik, Mark A., Vice-President, Operations, ICG Utilities (Ontario) Ltd.

m the New England Power Pool:
ess, Phillip C., Executive Director

Ontario

No. N-19

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy
Electricity Demand and Supply

First Session, 34th Parliament
Thursday, September 22, 1988

Speaker: Honourable Hugh A. Edighoffer
Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the back together with a list of the members of the committee and other members and witnesses taking part.

Reference to a cumulative index of previous issues can be obtained by calling the Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Service Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toronto M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Thursday, September 22, 1988

The committee met at 10:12 a.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY (continued)

Mr. Chairman: I call this session to order. e will shut down that air-conditioner so that we n hear ourselves.

Our witness this morning is Dr. Kenneth Hare, 1o of course was the commissioner producing e report on the safety of Ontario Hydro's clear reactors. He is here to speak to us on two bjects: first, the report, and second, the eenhouse effect, and he has produced a copy of e paper for us. I believe that the paper has been nded out to the committee.

As we have two separate subjects, I think the st thing to do would be to deal with the first and en with the second. Why do we not spend the st hour, Dr. Hare, on your report on the safety nuclear reactors in Ontario? Perhaps I could rn the floor over to you and you could mmarize the report, take us through your main nclusions and give us a bit of background on w you came to those conclusions.

DR. F. KENNETH HARE

Dr. Hare: Thank you, Mr. Chairman. I preciate the opportunity of appearing before e committee. The last time I did appear before a mmittee it was Donald MacDonald's committ e on Hydro affairs.

Mr. Chairman: A predecessor of this committee, two or three ago, I guess.

Dr. Hare: It was quite some time ago, but it as its report on the safety of reactors that was in me ways the landmark document on this. It as a serious attempt to assess how safe the actors are, and I started from that report so, in a nse, the wheel has come full circle.

I was simply asked by the Minister of Energy, 1o was then Vince Kerrio, to look at the safety reactors in the province in the wake of the iernobyl disaster. At that time the government d not, I believe, taken its decision to authorize e completion of the Darlington station. So the tting was that in announcing the government's proval of the rest of the Darlington enterprise, making the announcement, the Premier (Mr. terson) attached to it the statement that there would be a review of the safety of the reactors; hence Mr. Kerrio's appointment of myself.

Why me? I had just finished a study on lead in gasoline and the deputy minister had seen a copy of it. He apparently liked the look of it and he thought I was able to produce enough weight per dollar spent to justify it. Anyway, I cannot imagine any other good reason. I am not at all expert in the field of nuclear engineering.

The review was to be scientific and technical. I was not to look at the waste issue or at the issue of tritium sales. Specifically, I was to concentrate upon reactor safety, because that was what at that time, in the wake of Chernobyl, seemed like the politically most sensitive question.

I was to engage the services of experts from other continents, if I could find them, and from other countries. I made every effort to do so, but I think it should be said that most of the expertise in this field, because our reactors are so special, is actually within Ontario Hydro and Atomic Energy of Canada Ltd. themselves. My most difficult job was finding anybody outside those two organizations who knew anything about our kind of reactor technically.

We engaged a large staff of consultants. I did not bring it along, because I am not strong enough, but there is a volume of consultants' reports, which is considerably thicker than this, and a set of technical appendices, which is also thicker than this. These were prepared largely either by members of the staff of the review or by our professional consultants.

We commissioned studies from volunteer organizations, bodies outside the commission, that responded to our advertisement asking for an expression of opinion. We were not running a public inquiry. We did not hold public hearings but we did advertise widely to get technical comment in from external bodies. We were provided with the funds for doing this and we did hold a public workshop in order that the work could be seen to be going on.

It was up to me to boil it down to a technical report, and the report of which you have the first few pages in front of you was what I wrote in response.

Finally, I commissioned, with the agreement of the minister, the Royal Society of Canada to recommend the appointment of an advisory

panel, which it did, and a review panel, which was the body that I had to get the report past before I submitted it to the government. That was all done and the reports are all in the complete version, which is not before you. Their reports are in the complete version, in the thick volume, and I suggested to Tannis Manikel that you might at least want to have a few copies of this complete document around for the committee's use.

So that is the background.

Mr. Chairman: Perhaps you could take us through your conclusions then, just to outline them for the benefit of the committee.

Dr. Hare: The pagination in here is the same as in your document. I can quickly direct you to the specific pages. Starting off with page i. Unfortunately, I have the French version in front of me and I am sure most of you would prefer the English. It is inside the second red page in my document. I am not sure that yours has those red pages.

My primary conclusion was that these reactors were being operated safely, at a high level of technical competence. I could not doubt this, from what I saw myself and from the high opinions that I got from technical expertise everywhere about the manner in which Ontario Hydro is operating its reactors.

Lord Marshall, the chairman of the Central Electricity Generating Board in England, which is a technically much admired body, said to me: "You've got a good thing going in Ontario. For God's sake, don't tamper with it." The comments I got were generally of that kind.

On the technical grounds, I would have to say I could see very little to criticize and a great deal to admire. The view that the reactors were being operated safely, which is not at all the same thing as saying that the reactors are safe, is based upon the evidence which is on page ii.

My own view is that in this area it is desirable to base your conclusions, as far as possible, on actual performance, because there is such a volume of rhetoric about that an ounce of performance is a great deal better than a ton of rhetoric, and I tried to do that.

Another general conclusion was that the key to performance in this area–this is on page iii–is the performance of human institutions and individuals. I know that sounds a bit trite, but this is a highly technical field in which most of the analysis that you see done is of the hardware. That is to say there is an enormous literature pertaining to the safety of the mechanisms of the hardware inside the reactor building.

1020

It is very much more difficult to assess t quality of the work done, of the operati system. I was asked to report not only on t hardware, but also on the quality of the operati system. There I did have some recommendatio to make to Ontario Hydro, effectively that should never stop re-examining the operati system under which it worked.

There were certain aspects of it whi surprised me. For example, I was at first a staggered to discover that the shift length in t stations was 12 hours. I thought that was too lo to stay awake, but I was assured by one technic witness after another and by the people co cerned that it was not a handicap; nurses do it hospitals, and others. This is the classic thing th we looked at in some depth and, finally, we ma the criticisms that are visible on page iv her which I will not repeat since you have them front of you.

Among those, we felt there was a case f saying that the maintenance systems in the reactors ought to be brought under some kind more central control, that a bit more rationaliz tion was needed. We were highly impressed the safety record of the system with respect to i workforce. It is now approaching 130 millio person-years without a single fatality, and the is no other heavy industry in the province that h a record like that. No other part of Ontario Hyd has a record like that either. By far the safe place to work in Ontario Hydro is in one of t reactor buildings. If you can accept that statisti it is remarkable.

On the other hand, we were critical of the fa that the industry's own assessment of th situation was based almost entirely on intern perceptions and arguments. We felt that relationship to disabilities, for example, t industry did not compare all that favourably wi the heavy-chemical industry, which has simil problems in protecting its workforce. Anywa the criticisms, such as they are, and they are re and are being taken seriously by Hydro, believe, are on page iv.

We felt that quality assessment, quali control, was the key to the entire thing. T excellent safety record of the utility and i reputation outside depend more, in our opinio on adequate quality assurance than they do upo any inherent properties of the reactor syste itself. So we recommended that this again re-examined.

On page vi, we felt that the integrity of t pressure tubes was easily the central technic

iestion, and the most important question from a fety standpoint. The arguments are set out on iges vi and vii. I thought that while a insiderable amount of effort was being put –perhaps all that could be done with the vailable expertise–that there was a case for two ings.

First of all, there is a case for an even greater incentration upon the pressure tube issue. The ily accidents that have happened inside these actors have been due to the failure of pressure bes. I was not entirely satisfied that these could ways be contained, so I felt that there ought to an even greater emphasis upon it. I was told at e time and I have been told since that verybody who is competent to do this kind of ork, and every bit of equipment that could be it to work upon it, is already at work. But I still lt that in relationship to the scale of the roblem, the expenditures on pressure tube search, and I must say Ontario Hydro's nancial contribution to that research, were on ie small side.

The country is always criticizing the overall uestion of the amount of money spent on the uclear industry, as distinct from that spent on ther forms of energy, and I tend to sympathize ith that position. But, given that Ontario lydro's revenues from nuclear sales exceed $2.5 illion a year, I would have thought there was cope for still further expansion on the work done try to come to a reasonable solution to the ressure tubing. That is all set out on pages vii, iii and ix.

We also called attention to the fact that the acilities of Atomic Energy of Canada Ltd. are ssential to the safety-related research of Ontario lydro. If the federal government persists in hasing down the AECL effort, Ontario should e aware of the fact that it has a vital stake in the reservation of certain aspects of AECL's work: s engineering and research facilities are essenal to the safety of Ontario's reactors.

We were highly concerned about the Pickering station. One of the intervening groups–in fact, nore than one of the intervening groups–called or it to be shut down because of the lack of a econd high-speed shutdown system and because f the pressure tube failures. We accordingly ommissioned very expensive analyses of what night happen with the Pickering reactors if there vere a failure in the shutdown systems; in other vords, if there were a failure to shut down and a oss-of-coolant accident.

We asked Hydro to do this and we also asked he Argonne National Laboratory to do a parallel analysis, which it did. The results were reassuring in that the suggestion was that if there were further accidents that led to a breaching of the calandria at Pickering, it would likely be that these would be almost entirely contained by the containment.

Hydro is very busy rehabilitating the Pickering A reactors, so I decided that we would recommend the continued operation of Pickering A and not go along with the suggestion that it be closed down. There is no question in my mind that the work now being done is being well done. We were actually very impressed by what was going on at Pickering. I spent a good deal of time clambering around the inside of the reactor building and saw for myself just how difficult it is to repair the consequences of a nuclear accident.

I will not go over the rest of it in detail, but I would call your attention to one recommendation, which I think is not yet being acted upon and to which I attach a lot of importance. My own view is that the safety of reactor systems really must depend, to a very large extent, on continued scrutiny of public health and worker health in the setup.

There have been many people in the workforce of Ontario Hydro and AECL who have now been exposed to enhanced levels of radiation for more than 30 years. I think a very good job is being done on the study of these individuals. They are watched over, in effect, by external groups–the National Cancer Institute of Canada and the epidemiologists at the University of British Columbia–and so far the record is excellent as far as cancer mortality is concerned.

Although I did not agree with many of the criticisms made to me by intervener groups on this subject, I did agree with them on one thing, and that is that there is a very great need in this province for a proper public forum in which matters of public health can be discussed. There is no such forum. Your committee may offer that, Mr. Chairman, but there is no health-related advisory body analogous to the one that now exists, for example, in the field of waste disposal.

I think that there should be such a body and that this province should sponsor it. It obviously does not lie within the Ministry of Energy's competence to do this, but recommendation 12 on page xvii was one that I personally attached a great deal of importance to. I should be sorry to see it go down the drain.

1030

The rest of it I think I will leave. I did indeed go on to address the question of the adequacy of

the regulatory mechanisms–the Atomic Energy Control Board, in other words–which are a federal responsibility. I hope those recommendations will be looked at seriously by the federal government. Essentially, what I suggested was that AECB should remain a technical regulatory commission. It should not attempt to do the political job. It should be a technical body; but in making its technical decisions, it should be in a far stronger position to listen to arguments based upon public health, environmental and socio-economic issues. I recommended that both its staff and the membership of the board itself be expanded so as to make this more possible than it is at the present time.

I think I will leave it at that, if I may.

Mrs. LeBourdais: Apparently, this was commissioned as a result of the Chernobyl incident. Did you find one way or another whether an incident similar to the Chernobyl one could potentially happen here?

Dr. Hare: I would say that it is impossible for an accident similar to that accident in detail to happen because the reactors are so different, but it is not inconceivable that a very serious accident could happen to a Candu reactor. It would just be different.

The point is that the Chernobyl accident derived so much of its characteristics basically from two points. One was that it used an inflammable moderator. We use heavy water which is not inflammable. Second, though it is a pressure-tube reactor like ours, it has an entirely different kind of system. In other words, when you run the reactor up and then run it back down again, it does not go through the same sequence of stages that our reactors do at all. It is quite a different piece of machinery. But I do not rule it out. I do say in here that it is not impossible that an accident involving large escapes of radioactive material from a Canadian reactor could happen. I think the possibility is remote, but it is not impossible.

Mrs. LeBourdais: In my limited reading on the Chernobyl incident, as I reflect back, it seems to me that there was a human factor. I am just wondering if that is so. Are you aware? Were they on 12-hour work shifts as our people are here?

Dr. Hare: I cannot answer about the 12-hour work shifts, but I can confirm that the human factor was the dominant one at all stages. In the first place, the design of that reactor should have been challenged. In fact, it was challenged inside the Soviet Union, but the challenges were ineffective. Second, the work system–the operational system–by our standards was incredi lax. Third, when the accident did happen, th was no adequate system of containment. It is true to say there was no containment, but th was no adequate system of containment.

I cannot conceive of the possibility of happening under the tight technical managem we have in this country. The system of regulat is strong here. They do not have one really. It bureaucratic process there. Our reactor des lays far greater emphasis upon instant shutdo in the case of failures of any part of the system is completely automated, which is not true in Soviet Union. Third, the training of our workf ce is by many orders of magnitude m sophisticated than theirs is.

Mrs. LeBourdais: Just as your report ca about as a result of a major incident–and I sure there will be something similar created look at the Saint-Basile-le-Grand situation w the polychlorinated byphenyl spill and fire– the safety people try to come up with wha scenarios and bizarre combinations of events t could be outside the norm and hence lead to so catastrophe?

Dr. Hare: In the complete report, there i treatment of this question in the section on saf and accident analysis. Yes, that is precisely basis of the western countries' attempt to achi defence in depth. You try to imagine all things that can go wrong. But I was satisfied–in fact, neither were they–that we ha completely solved this one. There may combinations of events that we have not thou of that have not been allowed for. That is constant nightmare for all the people who responsible for this sort of thing.

I will say that I believe Hydro has a supe section dealing with this question of safety a accident analysis. I have discussed this at len with and I think they would admit and agree tl there might be sequences we have not visualize

Mrs. LeBourdais: One final question, i may. Your report seems to echo a comm thread that we see running through a lot of t other deputants. I guess it refers to what might seen as an isolationist policy by Ontario Hydro its dialogue with outside communities. I am ju wondering if you might care to comment a further, or how you see that being changed.

Dr. Hare: I do indeed lay emphasis on this; did my consultants and so, I may say, did t final review panel. Perhaps I should say that t final review panel had on it Frank Layfield, wl had run the Sizewell B inquiry in the Unit Kingdom, which by common consent is the mo

orough analysis of nuclear safety ever carried t. Mr. Layfield was particularly strong on the int that you are now making.

I can only say that my view is that what Hydro s achieved is a remarkable degree of internal orale, discipline and accountability. I would e them full marks on that, but I was disturbed the extent to which they do appear to be f-sufficient and that they do appear to need eater contact with the outside world.

This shows up in many ways. My scientific leagues at the University of Toronto–and this finitely included me–do not have a clue how tario reactors work. They do not have a clue out what safety measures are actually in force how they work. The fact of the matter is that nuclear industry seems to me to have failed to its points across to the technical community tside. It is also true, of course, that there is viously a rather hostile relationship between antinuclear lobbies and Ontario Hydro, but s is true of every utility that runs reactors.

What I felt and what I have said at some length here is that in some ways more serious is the t that the scientific and technical community the country does not know anything about se reactors either and I think this ought to be tified. I think it would be greatly to Hydro's vantage to go on a deliberate campaign to ate more effectively to the other scientists, the er engineers, who could perhaps give them ne good ideas and also perhaps be their bassadors, because they certainly need ends.

Mr. Charlton: First of all, I would like to ask a couple of questions about the criticisms talked to us about a few minutes ago, cifically in terms of what appeared to be a gmented approach to technical maintenance. u also referred to backlogs. I assume backlogs an maintenance that gets left for some period time without being attended to.

Dr. Hare: That is right.

Mr. Charlton: You have said in the report t you do not see any one of these items that you e listed in this package of criticisms as a jor threat, but as a whole list, there is at least a ential there.

Dr. Hare: Yes.

Mr. Charlton: Do you see the need for some d of mechanism to monitor that kind of thing the operation of the plants and to get at this estion you were just discussing a few moments o, which is the view out into the real world, if u like?

Dr. Hare: I think the maintenance question is being tackled. One of the things I was conscious of was that I only had to discuss a question of this kind with the staff of Ontario Hydro and I would find that almost immediately, if it had not already started, it would be tackled. In other words, they were highly sensitive. I think I was a useful foil for Hydro to try out their own ideas about how they were operating.

I think the situation as regards maintenance and backlogs has been changed. What I found was that there was a bewildering complexity about the system, about the responsibility for maintenance.

1040

It was quite true that the station manager was captain of the ship and responsible for the entire operation, but nevertheless, much of the maintenance that went on seemed to me to be going on almost in a detached fashion without any central control upon the station itself. Many of the groups responsible for this on the station actually were reporting to headquarters staff directly and without necessarily going through the station manager. I am not enough of an operational person to be sure that I knew about this, but my consultants pointed this out and so did the Operational Safety Review Team review done by the International Atomic Energy Agency. It was not just my impression; it was their impression as well. Yes, I do think that there needs to be an on-station complete co-ordination of the maintenance effort.

I do not believe that a lengthy backlog is an acceptable thing in this area because of the public safety considerations. It is unrealistic to say there should be no backlog at all, because if you want to employ your maintenance staff adequately and effectively, you do have to arrange things in priority and make sure there is always a day's work for them to do. I believe Hydro is tackling this. I had a letter from the president saying this was the case and I have no doubt that this is being acted upon.

Mr. Charlton: I guess what I was trying to get at and the concern in this list that struck me the most–and it is not just in this case in terms of the operation of these nuclear plants; I think it is a fairly consistent kind of societal complaint right through our large industrial sector–is the item you have in here, listed as (iv), where it says, "There are complaints that upward-directed safety recommendations are not always acted upon." I think that tends to be a complaint that you find in most large organizations, and the larger they get, the more frequent the complaint.

I guess what I was trying to get at is, is there a need to put in place some kind of a mechanism for the people at the bottom, when they are raising concerns and do not seem to be seeing those concerns addressed, through which they can take that problem?

Dr. Hare: The mechanisms do exist, Mr. Charlton, but they were not always effective. This is one of the points where I think Hydro has been at work since I wrote these words. We got this complaint from people on the stations, from first operators, people actually at the coal-face. I discounted some of it, because I too have felt all through my life that my good ideas given to my bosses were not always acted upon. I think that is what a boss is, a person to sort out one's suggestions between those that make sense and those that do not. It was the fact that they tended to disappear into thin air; that was the complaint made to me by union people and by first operators. I think that, obviously, is a wrong thing and I agree with you it exists in every large organization.

Hydro's theory of this was that there was a mechanism directly to the nuclear integrity review committee. In the event you felt your boss was not paying enough attention to you, you had the right of direct access to this review committee. But we also discovered that there were some members of the workforce of Ontario Hydro who did not even know this committee existed; so they could hardly know the route to short-circuit their bosses. Telling tales is an essential part of safety in big organizations, and you have to make it possible for people to use.

Mr. Charlton: I guess what you are saying, though, is your view is that this can be sorted out internally in Hydro without setting up some other apparatus.

Dr. Hare: Yes, provided you constantly jolt the organization. One of the things you have to do with big organizations is re-examine things every now and again to get people out of a complacent posture. It is very easy, when you are in a big organization, to settle down in a even groove. I was saying to somebody before this began that the Trotsky theory of continuous revolution is what you really have to have in running safety-related, major organizations of this kind.

Mr. Charlton: Perhaps I could move to one other area I would like to discuss with you, which is the tubes' failure problem itself, less specifically the tubes' failure problem and more specifically the problem of the tubes themselves. You have essentially said in the report that from a safety perspective, although you would lik see them doing more research to resolve problem, the tubes' failure problem is man able from a safety perspective.

It is not specifically set out in your report, you made some interesting comments at the p conference when you released the report. Un tunately, I cannot quote you exactly. We did have Hansard on for that press confere Essentially, what I understood you to say that, in your view, Hydro had not found solution to the tubes' problem and that, in absence of a real solution, the tubes' prob could have major economic consequences Ontario Hydro in relation to the operation of reactors. I am just wondering if you m comment on that.

Dr. Hare: As of the time we did the stud was left with the feeling that a perma solution had not been found, but a tremend amount of work was being done upon it an being done upon it along the following li First of all, it is obviously necessary– necessary, because I think it is now the case be able to monitor the performance of these t while the reactor is at full power, in other wo to have in-reactor testing so that you are not t by surprise when the tubes blow. That is the point.

Prior to the Pickering accident, the obvious way to detect these things was to de water vapour in the annular gases that surr each pressure tube because that would indic leak. The theory was that a leak would prece burst. Well, it did not in the case of one of severe accidents. They were not severe in sense of blowing things out of the atmosph but they were certainly severe in their econ consequences.

It is necessary to improve that. I am told th now being done and I hope it can be done so there never again will be an occasion when o these tubes will burst without announcing i beforehand, so that the reactor can be shut d before the moment actually comes.

Second, a tremendous amount of effo being made–I watched it–to get to the botto the hydride formation business and also consequences of faulty installation meth which have been got around. Hydro's people assure me that, even without any repl ment of the present alloys, the life expectanc these tubes, the replacement rate of the tub going to be sufficient to minimize the acci risk and still leave the reactors economi remains to be seen whether that is the case or

ey are all very confident. I do not consider that annot express any opinion about whether it is ing to succeed or not.

Mr. Charlton: Thank you.

Mrs. Sullivan: I also want to talk about the essure tube question. As I understand it, the essure tubes operated for much longer than was iginally predicted, the Pickering A and Pickerg B. Was not the lifeline on Pickering A 10 ars and those pressure tubes had been operatg up to 12?

Dr. Hare: No, no. My understanding is that ey were expected to last considerably longer an they have in fact lasted. There have been rious figures bandied about. I notice, for ample, that Mr. Burroughs is present in the dience and he knows this much better than I , but I understood that the economics of this sumed these tubes would indeed run 25, 30 or years, the full length of the operation of the actor.

It was admitted that they might not, in other ords, that the period might be shortened, but I d not think anyone expected them to fail quite fast as the ones at Pickering have done. I am t offhand trying to calculate in my mind how ng it was. I think the one was opened in 1973 or ereabouts and it went in 1983. As you say, it is out a 10-year period. I would have said, given cost involved, that replacing these tubes ery 10 years would be an extraordinary onomic burden for the industry to have to bear.

50

Mrs. Sullivan: But at Bruce, I think they had en operating for about 17 years–

Dr. Hare: Some of them have.

Mrs. Sullivan: –before the replacement was cessary. I suppose the questions that I am ding to relate to the economic efficiency of placement but, as well, to the technical change d technological improvements that are being de over a period of time that, indeed, make the placement even more viable than it was at the ginning of the construction, and it might even d at some point to a situation where we will not ve to decommission a nuclear plant at all.

Dr. Hare: Well, I would have serious ervations about never having to decommisn one. When Bennett Lewis was first developg the idea of the reactors, it was his hope and sh that they would indeed be capable of being en on to advanced fuel cycles, other kinds of l cycles, without any major structural change the reactor. I very much doubt whether this ll happen, whether the reactors can be kept indefinitely in use without decommissioning. On the other hand, I also do think that they certainly ought to be able to run through a long enough lifespan to justify the capital cost of their construction.

My own report here lays emphasis upon the metallurgical question. The number of alloys you can use to keep these tubes going is extremely limited, but we certainly have not explored all of the possibilities. The difficulty is that you cannot do experiments on these things that mean very much unless you do them actually in the reactor. In other words, you have to judge from the performance when the reactor is operating, so it is a question of learning as you go along. Solvitur ambulando is the Latin phrase my tutor used to use; solve it while walking.

Mrs. Sullivan: Thank you.

Mr. McGuigan: You mentioned that the record of fatalities in these facilities is zero so far, but you said there were some disability problems. I wonder if you might just tell us a bit about that.

Dr. Hare: So that people can see what we are talking about, I am trying to find something. It is on page iv, paragraph C.R.2.2, item (i). The rate of temporary total disabilities was somewhere in the order of–Mr. Chairman, may I have long enough to find the diagram in this lengthy report so that I can quote an accurate figure? I have just been in Australia for two months, and I have forgotten everything about the contents of this report. I do not think I can find this one easily, so perhaps I had better not waste the committee's time while I try. It was 2 per 100 million. Perhaps Mr. Burroughs can render the statistic. What is the statistic that we are talking about?

Mr. Burroughs: It is 2 per 10 million.

Dr. Hare: Is it 2 per million person-hours?

Mr. McConnell: I thought it was 2 per 10 million.

Dr. Hare: It is 2 per 10 million, which is a very low rate. It is not something that we ought to be alarmed about, but it is still higher than the target set by the heavy chemical industry.

Mr. Burroughs: It is per million in terms of the short-term ones and the disability ones are 10 million.

Dr. Hare: It is the disability ones we are talking about.

Mr. Burroughs: Permanent disability?

Dr. Hare: Temporary total disability. I do not think this matters. The unit will not mean any more to you than it did to me when I first heard it.

The point is, it was two of these units, which was excellent by comparison with most other industries. In fact, extraordinarily good in relationship to the general performance of industrial safety in this province, which is, in my opinion, not good enough.

When you compared it with the heavy chemical industry, the heavy chemical industry was already getting well below that, and indeed some of the Ontario Hydro stations were going well below it. We thought this ought to be looked at. The target that Ontario Hydro was setting itself at that time was six. That was far too lax, in our judgement, and we said so. I understand that they have subsequently lowered that standard substantially.

Mr. McGuigan: What prompted my interest was that in a previous committee we were studying fatalities and accidents in Ontario mines. One of the recommendations we made there, and I think it refers to talking about the maintenance and there not being a central control on it, was that accidents be reported to the chief executive officer. In other words, it was not satisfactory to have a safety officer sitting off in an office by himself and the information ending in that office. If you really wanted results, such as the bottom line–industry talks about the bottom line–you had to go to the top guy to get those results.

It seems to me that what you are talking about here is very similar. You go to the very top man in the organization and make him aware that these things are happening. I know that goes somewhat against the theory of organization; nevertheless, it was one of the recommendations that we came up with. Only time will prove whether that is correct or not.

Dr. Hare: Of course, if these injuries involve any departure from normal operating practice inside a reactor, they will in fact be a matter for a report that will go up to the nuclear integrity review committee, but these are conventional injuries that we are talking about, broken arms, shin bones and so on. There are a great many of them in Ontario Hydro.

I am just looking at the figures, which I have found now. Overall in Hydro, the figure is raised between 5 and 15 per million person-hours of work. The nuclear generating division was operating in the vicinity of two, so it was doing splendidly by Hydro standards. To us, it was doing too much, judging its performance alongside the rest of Hydro, and it should have looked at the heavy chemical industry. I employed people from the heavy chemical industry to look at this question because I thought a differe perspective was very good.

But can I just tell you how well the indust does by comparison? In all Ontario manufactu ing, over the 10 years ending 1986, the disabil rate was 32 and the nuclear generation divisi was 2. So we are doing something right.

Mr. McGuigan: You talked about constant examining the health of the people inside t plants. A lot of concern has been expressed abo people living nearby. Have any studies be done or have you looked at studies that indica whether or not those people have any differe rates than the general population?

Dr. Hare: There is a lengthy treatment of th question in the complete report, but let me ju summarize. In general, the answer is no.

Mr. McGuigan: No study, or no difference

Dr. Hare: No study. The dose rates are ve low. There is no question about that. It has bee the feeling that it would not be possible to dete any impact and therefore it was not worth the co and the effort of mounting a major epidemiolog cal study of the populations around the reactors

There are only two reactors that have signif cant populations around them. One is Pickering In the future it will be true with Darlington, but is not yet operational, of course, and there is small but significant population near Cha River, which is where the Atomic Energy Canada Ltd. research reactor is.

1100

We could get no information about th Canadian scene, but we did go to the British wh have done a very elaborate analysis of th question in the vicinity of all British nucle installations that were opened before 195 There is a long, long record there. It was foun that there was certainly no sign of the gener cancer incidence near the reactors being an higher than it was away from the reactors, bu they did find one exception to that: among peopl under 25 years of age there was a statisticall significant increase in the rate of certain kinds c leukaemias near the installations. They doubte that this was actually caused by radioactiv materials' escaping from the reactors, becaus the kinds of leukaemias that were higher in num ber were the kinds not normally associated wit radiation exposure. So they doubted whether th cause was, in fact, the reactors, but it seemed thi result absolutely cried out to be examined here i the vicinity of our reactors and I recommende doing so.

I understand that the Atomic Energy Control oard has, indeed, commissioned a feasibility udy this year, which will look at the possibility because it is not an easy thing to do–of entifying the incidence of leukaemia in chilen around the urban site reactors, around ckering, essentially. I hope this will be done, I ope this will turn out to be feasible on a large ale and I hope the result will be negative, but ntil the study is done, that is an open question in y mind.

Mr. McGuigan: But even when you do it, you ll have a problem identifying whether or not it n be attributed to the nuclear stations.

Dr. Hare: Yes. Cancers are not labelled. In e case of asbestos cancer formation you have e easy way out. But it is generally a mesoelioma that results from asbestos and so in a nse it is labelled because those cancers are very rely caused by other agents. But in the case of diation cancers, they are not labelled. You ve no means, other than by showing that the pulation is getting more than it would be tting otherwise. The reassuring quality of the idence we have so far is that the workforce, hich is very much more exposed than the public several times more than the public is, shows signs that we can see.

Mr. McGuigan: There is always the possibili- that young people are affected more than older ople.

Dr. Hare: That is the point. The workforce nsists entirely of older people. It is in the ung where this effect is likely to show itself if ere is an impact. Our recommendation in the port is for the government of Ontario to do erything in its power to assist what is actually a deral responsibility, in making sure that our spital system, for example, goes along with e need to provide data. It is going to be a long d hard job if it is done.

Mr. McGuigan: Just on the Chernobyl cident, we tend to focus on that because it was ch a dramatic thing; I guess my own feeling is at if we had such a lax system in our open ciety, people would come forward and tell us out it. I guess my own theory is that it could not ppen, it is much less likely to happen in our ry open society as compared to their closed ciety.

What about a person running amok in one of ese places? I understand there are two people in e missile silos who have keys to send off the ssile. Each one of them has a revolver to shoot e other in the event that he runs amok. I am not suggesting we have that in our nuclear stations, but what safety precautions do we have so that nothing of that sort might ever happen?

Dr. Hare: I was, of course, aware of this question and consulted the president of Ontario Hydro, who authorized one of his senior officials to talk to me about this and I looked at it. It is obviously possible for a terrorist or a lunatic to create a certain amount of havoc. I was made aware of what Hydro would do in the event that this happened. I undertook not to talk about it in public, and I think that is a very good decision. They are perfectly well aware of this danger and I think capable of dealing with it.

My anxieties lie with the province's failure to establish an adequate emergency system outside the plants. Inside the plants such a problem would be contained. I am not at all sure it would outside the plant. I am very critical in the report of the emergency measures situation.

Mr. McGuigan: I guess if they are carrying revolvers, we would just as soon not know about it.

Dr. Hare: I would sooner see a gun-free society.

Mr. McGuigan: Yes. Your biggest concern is outside rather than inside?

Dr. Hare: Yes, it is outside. Inside, you have a very highly disciplined system. People know what they are supposed to do and they know what other people are supposed to do. If they see somebody stepping outside that, it is not likely to go unnoticed in an Ontario Hydro plant. But outside, let's face it, eccentric behaviour is one of the freedoms that democracy guarantees. You can be a lunatic if you want to. It is not really the lunatic, it seems to me, that poses the problem. The problem is the unforeseen weakness in the legitimate system. For that reason, I have attached far more importance to that in the report.

Mr. McGuigan: Thank you very much.

Mr. Runciman: Dr. Hare, you mentioned the significant or severe accidents that could be visualized in Candu reactors. You mentioned two that had been identified by the Atomic Energy Control Board. I gather you had to rely on the AECB in that respect in terms of identifying potential severe accidents. There was no other agency or body familiar with Candu reactors significantly to comment on that aspect of it.

Dr. Hare: Yes, there was the International Energy Agency which did, in fact, carry out an inspection of the Pickering facilities during our work. We had access to that.

Mr. Runciman: In respect to the two that were identified, was it limited to two? Were those the only two potential severe accidents that could be visualized by either the international body or AECB?

Dr. Hare: Yes. We did discuss other possible scenarios, but the consensus and the technical evidence that I took was that these were the two accident sequences that were at least conceivable and might have drastic consequences.

Mr. Runciman: What does this mean? We obviously have some understanding of "failure to shut down," but just what does "following the large loss of coolant or a loss of regulation" mean?

Dr. Hare: It is unfortunate there is ambiguity in this word "regulation," because it does not mean loss of the Atomic Energy Control Board. What it means is that the reactors are under tight, mechanical, electronic control. The core of a reactor is its computer system. Between the control room and the reactors themselves there is a battery of computers, a duplicated system, so that if one goes, the other one cuts in. These computers are programmed to identify any abnormality of operation and if there is any, to correct it, and if it cannot be corrected, to shut the reactors down.

If by any chance there is a failure in what I would much prefer to call control systems, it is conceivable that the reactor might run away, as it can when there is a loss of coolant. That is why it is identified there as a possible accident sequence.

Mr. Runciman: When you talk about significant consequence, there have been about 700 significant-event reports every year. How many of those are dealing with regulation? Do you have any idea? Can you recall? Was it a significant number?

Dr. Hare: No, but they do occur. There have been quite a few shutdowns–particularly in the early days of Pickering, to my recollection–that resulted from problems with the mechanical regulatory system, but most of these significant events are not connected with the control system. The control system seems to be one of the strengths of the Candu. It is a remarkably effective and reliable setup. One of the problems with it is that once you get it going, there is a tendency to keep the computers going too, and of course computers become out of date in no time flat.

1110

Many of the electronics, the relay systems a so on that are in use in Pickering are from bygone age as far as the technology is concerne but they have been proved out. Once you have system that is proved out, you are reluctant change it for any other.

Mr. Runciman: I am just curious. The systems have automatic shutdowns on them. you mentioned, if something is abnormal, the is an automatic shutdown on a regulatory syste Do these systems also have built-in override manual overrides or bypasses?

Dr. Hare: Yes and no. This, of course, is o of the things that happened at Chernobyl. Y can program them out if you want, but und ordinary operating conditions you do not. Y are not allowed to, either. These systems must in place before the reactor operates. It is r impossible to drain the gadolinium nitrate out those tanks. It is not impossible to lift cont rods out of the reactor.

Mr. Runciman: Or to adjust a shutdown point.

Dr. Hare: But if you do, then you will not able to operate the reactor, the way the thing is up. To operate the reactor, they have to be position and ready to fire.

Mr. Runciman: I suspect there is a range terms of safety, that there is a measure of latitu so that if you are approaching a critical point, some stage you get a shutdown. I am just curiou In terms of that critical point, if an operator, example, is operating on the verge of that criti shutdown point and says, "Look, I can get t straightened around," he can adjust that set po closer to the point of no return, if indeed wishes to do so.

Dr. Hare: To illustrate my point, of cours when the Pickering accident occurred in Aug 1983, if the operator had done nothing, I am s that the shutdown systems would have shut t reactor down. But the operators became aware the problem before the shutdown systems d and they manoeuvred the reactor down to c shutdown themselves, without the interventi of the mechanical system.

That, if I may gratuitously say so because I conscious of who is sitting behind me, is commentary on the skill of these Canadi operators, and it is what was lacking at Th Mile Island. It was one of the things that w lacking at Chernobyl. These fellows were able do this and thereby save the corporation and t taxpayer a lot of money and also to minim risk, because they knew what was going on at

mes. In effect, the system was never out of ontrol.

Mr. Runciman: I share your views in respect the human factor. When you take a look at the aajor airline disasters now, they are primarily all ttributed to human failure. I think that is the big uestion mark in respect of these reactors.

You talked about a periodic requalification of taff. Is that not taking place now at all?

Dr. Hare: Increasingly, yes. But I want them go further than is actually the case. These eactors are admirable training places. That is to ay, the simulation facilities available are effec-vely 100 per cent. You can go into a control oom which is not a control room at all; it is just a aining place, but it is the same as the control oom that actually operates the reactors. At the echanical level, you can put people through all inds of drills that ought to be gone through.

A point we make somewhere in here and that I ake again now is that it is just as important that e people at headquarters take part in these etraining exercises as it is that the operators take art. It is the entire system.

If I might be just a little antidemocratic for a econd, with apologies to this committee, I think safety matters, while it is important that ideas hould flow upwards, it is also important that the hief executive officer and the chief operating fficer keep pushing downwards on this ques-on; in other words, that the safety never be ken for granted, that there always be initiatives t the top to get down into the operating system to ake people out of any complacency that may rise.

Mr. Runciman: In respect of that, I think our concerns about 12-hour shifts are quite valid s well, although I can understand employees nding them attractive in terms of time off. I do ot think the analogy in respect to a nurse or a refighter is as appropriate as it could be in this ituation when you look at the magnitude in erms of potential for disaster. Perhaps that is omething you and this committee might want to onsider taking a stronger stand on. Did you talk any employees who were working the 12-hour hifts?

Dr. Hare: Oh yes, sure.

Mr. Runciman: What is their view?

Dr. Hare: Absolutely unanimously, they ked it. Sure, some of them were probably oonlighting. To do three consecutive 12-hour hifts, three 12-hour shifts close together, as lose as the regulations permit, does give you ome time off in which you can do that kind of thing. But I do not really think that is what these fellows had in mind. I formed a very high impression of the motivation of the people I was talking to. They were proud of their jobs and very horrified at any suggestion that they would moonlight.

Mr. Runciman: I am not making that suggestion either; I am just sharing your sense of concern in respect of these 12-hour shifts. I appreciate where the operators are coming from and why they enjoy 12-hour shifts and why it is happening right across the country. But I think that in this one particular industry perhaps it deserves more than a glossing over in respect to taking a look at the implications of this and how people function at their given point. That is my only observation.

Dr. Hare: I recommended that the corporation take yet another look at its operating system and use external expertise in doing this. This is obviously one of the questions that would come up in any re-examination of the operating system.

Mr. Cureatz: It is a pleasure to have you before the committee. As I am not usually wont to do, I am going to ramble on a little bit about some of my thoughts and concerns.

Mr. Chairman: We hope you will be fairly brief.

Mr. Cureatz: Yes, I will.

At the end, I will ask you for a response to a final question. As a long-standing member of this committee–some think too long–I have seen a lot happen and a lot of investigations and have had the good fortune, in some ways, of having the Darlington generating station being built in my riding. I felt very comfortable about your praise of Ontario Hydro and various aspects which we will not cover again.

In terms of politics, it leaves a humble soul such as myself in a somewhat embarrassing position of even attempting to criticize Ontario Hydro, because lo and behold, I got my local newspaper today, the Bowmanville Canadian Statesman, and there it is, "Hydro Funds Will Help Improve Roads in Region." It is a little tough for me to be sitting here and whacking at these phalanxes of people from down at the fancy building at the corner of College and University Avenue because they are helping my area, and part of my job is to look after my constituents.

By the same token, it is interesting that over the last number of years I have sat on the committee I have noticed some aspects taking place. One is in terms of some of the other

concerns that you brought forward, the safety aspects coming from the bottom, going up. Actually, it is rather shocking to hear that you feel that in the scientific community there may not be a working understanding, a hands-on understanding of the reactor structure.

I always envisioned that if there were some kind of accident an Ontario Hydro official felt uncomfortable about, he would phone somebody at the engineering department of the University of Toronto or University of Waterloo and say: "Look, we've got some vapour condensing in our vacuum building and it's not going the way we thought it should go. What do you think about it?" Then if the professor asks, "What is a vacuum building?" I start getting a little concerned.

Maybe, and I am serious, we should be having Ontario Hydro have a boondoggle once a year and bring down all the scientific people in regard to this very serious matter of producing electricity from nuclear power and inform them what is going on. Then in their idle spots they can be thinking about how these things all work, and in the event that something does take place, someone will at least have given it some thought. My attitude always has been that we do not want anything to take place. Safety has to be paramount. How can we have an evacuation of the Golden Horseshoe with a nuclear reactor running out of control? We cannot. So we have to be on top of safety all the time.

1120

At the same time, we had the gas people in front of us yesterday and, of course, they are looking at their interests and sort of complaining about Ontario Hydro, price fixing, how Hydro gauges what the gas prices are and how they gauge what the gas prices are. We have had some innovative people before us talking about how they can produce electricity a little cheaper.

Then I look at Lorne McConnell, who has been here for a long time, and with the welcome I receive within my own Conservative caucus from time to time, probably he is going to be here longer than I am going to be here, and I have been here for a while. That frightens me because he has gone through more ministers of Energy than you can shake a stick at. Politics and politicians come and go, and he is still here.

After revealing all these things, I am beginning to think–heaven forbid, Brian Charlton–that maybe there should be, somehow, some kind of overall group. I am thinking now of the latest thing out my way, in the Pickering and Darlington generating stations, the transport of tritium to my area. I feel comfortable about th safety aspects.

On the other hand, the perception is th people are at opposite ends of the pole: We hav Ontario Hydro screaming that it is all right. W have the antinuclear groups screaming that it i not all right and going to court and all kinds o things. Meanwhile, people across the provinc are scratching their heads and wondering wh people cannot get together and feel a little mor comfortable about this.

I am summing up by asking you whether yo can envision some kind of structure, a committe or group of people who maybe should be thinkin in terms of monitoring Ontario Hydro on continual basis, notwithstanding elections an people being replaced, so that there is a continua hands-on review, always a review, as you said the continual revolution aspect. It would be mad up of whom? Who would appoint them? How d we do this?

Dr. Hare: I could go on all day about this, bu I am sure there is not time.

Mr. Cureatz: Good. Take a few minutes.

Dr. Hare: Quite simply, I did recommend th appointment of an advisory committee on nuclear safety. I recommend strongly that it do it work in public. I recommend strongly that i carry out public exercises like workshops an get-togethers.

Mr. Cureatz: I am thinking about expanding beyond that.

Dr. Hare: Perhaps so; if it can be done, all to the good. This is a field, as I said, that is long on rhetoric and low on knowledge. It is a technically very difficult field and it is very hard for the poor public to come to terms with it. My criticism of my own colleagues in the scientific and technical world is that they do not take the trouble either. Many of them know little more about the operation of a reactor than Joe on the corner, and they should. Hydro should do its absolute best to make sure they do by doing the sort of thing you are describing. You and I are in the same boat anyway, Mr. Cureatz; students come and go but professors go on for ever.

Mr. Cureatz: Thank you.

Mr. M. C. Ray: I have a couple of questions regarding two aspects, one the emergency measures and the other the public perception and the role of government in both of those.

Dr. Hare, your report indicates that the Solicitor General is responsible for emergency measures and plans and that that ministry prepared a nuclear energy plan. Then it goes on

say that nothing has happened with that plan. ɔu make the statement that if there were a vere accident, we would find the utility ɜpared and the province unready. Is that the uation today?

Dr. Hare: I have been in Australia and New ·aland for the last seven weeks, but before I 't, they did appear to be scrambling at least to ıke the appointments that were required to put ː nuclear emergency preparedness plan in ıce in the Ministry of the Solicitor General. I not know what has happened subsequently. ıe or two members of my staff were ap- ɔached by the Solicitor General's department th a view to taking them on to work for it, ıich is a good sign, but I do not think that ıtters have gone very far.

I should not say this, Mr. Chairman–I have not ːked up a phone and called up the people in that partment–but essentially the province had tirely neglected this field. They had one man d a half-person. I think it was a woman; I am t absolutely sure, so let me say "person." That s the entire effort devoted by this province to clear emergency preparedness, as far as the ɔvincial bureaucracy was concerned, as com- ɾed with approximately 450 in the state of nois.

Mr. M. C. Ray: I asked that question with ɔther motive in mind, Dr. Hare. I happen to ne from the Windsor-Essex county area where public fear is of a nuclear accident, not at ıce but at the Fermi 2 plant in Michigan. We given assurances by the Solicitor General's nistry that emergency preparedness plans are only in effect, but adequate, and the public is ured that there is nothing to fear in the event of ɜvere accident at Fermi 2.

That leaves me in a very peculiar position. If re were an accident in Ontario from an Ontario nt, we are saying that the province is not dy. Yet if there were an accident at a Fermi 2 nt in Michigan, we are led to believe the vince is adequately prepared. I have some ficulty in making those two suggestions tch.

Dr. Hare: My remarks were made without ard to where the accident was. There had not n any effort to spend provincial money on ing up the structures recommended in the vince's own emergency plan. I understand re was a cabinet decision to send the bill to tario Hydro, but as of the time I wrote this ort, it had not happened. Nobody had been ɔointed and it was still essentially one and a f people who were attempting to meet this challenge. I might say they were doing a splendid job, but you cannot do very much if you have only one and a half people.

Mr. M. C. Ray: I intend to follow up on that, because I am not satisfied with the answers we appear to be getting. It confirms the public perception in the Windsor-Essex county area and the fears of the people as to the readiness or the capacity of Ontario to respond to a nuclear incident, not just within its own jurisdiction, but within another jurisdiction.

It is interesting to note that your report also says that the nuclear emergency plan would provide "for exchanges with other jurisdictions (including transboundary relations with the United States)." That is what we are assured is in order and capable of adequately responding to an accident at Fermi 2 in Michigan. I have some problem.

May I relate it to the second concern? That is the Decima poll we were given some information on and which was commissioned by the Canadian Nuclear Association. Maybe you could tie the two issues together for me. It says:

"First, Canadians' uncertainty about specific issues associated with nuclear energy provides grounds for their divided opinions on its present use.... Canadians are relatively positive in their assessments of Canadian operations and regulations compared to those of the United States" but "they are generally undecided (neutral) in their belief about the competence of the Canadian industry. (Thirty-three per cent describe it as competent, 28 per cent do not, and 41 per cent are neutral)"

Then it goes and says, and I will paraphrase it a bit, that furthermore a majority, 51 per cent, say they lack confidence in the safety and containment systems at Canadian installations. In the light of that, what would you say the role of government is in correcting public attitudes, if the attitudes of the public are inaccurate?

1130

Dr. Hare: I really cannot answer that question. I am not an authority on how governments should do their business. I can only say that I think it is correct that there is widespread anxiety in the public about safety-related questions. It is very difficult to find people who are credible in the eyes of the public who can describe this in objective terms. I try to do so, but I am a technical person; I am not a politician. I cannot sell ideas to the public. But I share your feeling that there is this uneasiness. I think the only thing that can possibly be done is to give absolutely

maximum possible visibility to the facts of the case. Let the facts speak for themselves.

Mr. M. C. Ray: I wonder if the public's attitude is not shaped to some extent by the kind of situation that I just described with respect to emergency planning.

Dr. Hare: It may well be. I feel that the emergency planning issue has not been well handled. I think this province needs to look at its approach to emergency measures generally, not just in relationship to the nuclear business. Leaving it to the municipalities, which is true of the other kinds of emergencies, has, I think, failed to create the central consciousness of this as something that a democratic government has to face up to.

Mr. Cureatz: Sort of sounds like Sunday shopping, doesn't it? Let's get into that.

Mr. Richmond: With the completion of the station, as you well know, Ontario and Ontario Hydro will have some 20 operational Candu reactor units. Some people might say it is a strength to have a standard nuclear technology. None the less, some people have bandied the idea before the committee that in fact Ontario will face an overreliance upon nuclear power and an overreliance upon the same type of technology. From your analysis of the safety aspects, and you hit upon the retubing and the metallurgical aspects of that, do you have any opinion on that issue?

Dr. Hare: Purely as an individual, I do have an opinion. The dependence of the province on the nuclear component for power, by the year 1993, will be about 69 per cent. That is a very high proportion. That is a very large number of eggs to put in one basket. It is higher than anywhere else among sovereign states except in France and Belgium. I do not really think I want to put all my eggs in one basket, and I think that one should go for a measure of diversification in the modes of power generation that one uses in an electrical system. However, I should point out that the alternative in this province is fossil fuel, and there are reasons that fossil fuels create problems too, so we are in a bit of a bind about solving this question.

Mr. Chairman: On that note, perhaps we could move on to the second subject of the afternoon–nice lead-in there. We have about 25 minutes left.

You have distributed a paper to us which I believe you presented to the World Conference on the Changing Atmosphere earlier this year. I wonder if you might spend five or 10 minutes just summarizing the paper for us and telling us a b about the greenhouse effect. Then we could hav some questions and discussion with the commi tee for the remainder of the period.

Dr. Hare: This is a field in which I can clai to be a reasonably expert person, whereas in th matter of nuclear I was simply a sort of broke trying to interpret what I heard from oth sources. This is my own field and I am th chairman of the advisory group on greenhous gases of, let's say, the United Nations systen Several UN agencies contribute to our work.

If you will look at this paper I have given you, can short-circuit it. This is what I told the Worl Conference on the Changing Atmosphere, i Toronto on June 27, and I have not changed m opinions since then. The essential points are o pages 9 and 10.

1140

The atmosphere's composition is being char ged by carbon dioxide, primarily from fu consumption; by chlorofluorocarbons whic come out of scrapped refrigerators, plastic foa and, in other jurisdictions, spray cans; by nitrou oxide, off agricultural land probably; by meth ane, and we do not know where that is comin from but it is probably coming off the great bog of northern Ontario and places like that and fro agricultural land in the tropics, and by ozone.

The effect is to increase the capacity of th lower atmosphere to trap heat near the surfac and therefore to raise the temperature near th ground. The estimate is that by doubling the tot effect, which might happen by as early as th year 2030, surface temperatures would increase according to the models we use, somewher between 1.5 degrees and 4.5 degrees, th uncertainty arising out of a great many things most notably the poverty of our models rathe than any kind of uncertainty in nature itself

These effects are likely to be very uneven Some regions will be much worse affected tha others, but it is likely that these effects will b highest, strongest in the northern hemisphere an in northern middle latitudes. On most of th model outputs that we have to date, Ontario i likely to be one of the most affected parts of th world.

Unfortunately, we cannot say very much abou rainfall and the hydrologic cycle, but the mai thrust of the results we have so far is to sugges that agricultural land will become considerabl drier in mid-latitudes. Ontario agriculture will b exposed to drier conditions in its soils.

Finally, there is more than a suggestion th the present rise of sea level, which is going o

ow at the rate of probably around about 15 entimetres per century, is likely to accelerate as result of this warming and it may well be that a levels will rise by something between half a etre and a metre in the course of the next 50 to 00 years.

Almost all climatologists agree on the broad utline of what I have just said. What this onference did, and what I hope this committee ight be interested in, are two things. On page 2, I ask the question, "Has the greenhouse arming yet shown itself?" I am of the opinion at it has. The world surface temperatures have sen by about 0.7 of a degree in the last century, nd that is almost precisely what models predict hould have taken place if it is the greenhouse ffect at work.

I stuck my neck out at this conference and said thought that yes, the effect has actually shown self. The more conservative members of my rofession and the editor of Nature took a ifferent view. I was given the unique privilege f being personally attacked by the editor of ature in his leading editorial, saying that people ho know better are talking their heads off too uch about this, that there is no reason yet to say is effect has been demonstrated. I think a ajority of people in my profession would say at it has been demonstrated and that, in any ase, people concerned with energy policy and ublic health should assume that the greenhouse ffect is with us and consider its consequences.

With a view to getting this done, this country, nd specifically Mr. McMillan, the Minister of e Environment, pressed hard for a world olitical conference or a conference at which ere would be political participation. This aper, The Greenhouse Effect, that I am putting front of you is what I read to that political onference, which was here in the conference entre. It was attended by Mrs. Brundtland, the rime Minister and quite a lot of other ministers. was an excellent conference.

This conference produced a statement, and I ave suggested to the clerk that this committee ay want to have this conference statement in its le. The conference statement calls for political ction now to protect the world against the otential consequences of the greenhouse action.

One of the specific recommendations that is ade is that the consumption of fossil fuels–coal il, and natural gas–in the advanced countries be educed by 20 per cent by the year 2005. In other ords, there is a specific call for a reduction in e use of coal, oil and natural gas. Obviously, is has a bearing upon how this province in the future gets its energy. I thought I should call your attention to it and be prepared to answer questions about it.

1140

Mr. Runciman: Dr. Hare, you mentioned that Ontario was going to be one of the most affected areas. What specifically do you see happening in Ontario according to your models?

Dr. Hare: I am referring particularly to the models of the geophysical fluid dynamics lab at Princeton, which is one of the three or four places around the world where you can do this kind of thing. They show a rise of summer temperature in central North America extending right across the Great Lakes region into our province of over five degrees Celsius and at equilibrium for doubling of the greenhouse effect. As a matter of fact, one of their models shows as much as a nine-degree increase.

If increases on that scale were to take place in the next 50 years, it would make a fundamental difference to Ontario agriculture, the navigability of the Great Lakes and the discharge from the lakes. I am about to present a paper in Chicago suggesting that there may well be a 15 per cent decrease in the discharge of the Great Lakes systems through the turbines and penstocks of Ontario Hydro, among other things, and finally that there would be a very substantial change in the navigation season on the Great Lakes if they were realized.

These are not by any means certain statements. They are just the kind of thing we can see now over the horizon, but I think the level of certainty attached to them is probably rather higher than the uncertainty that we have with our economic indicators of future conditions. I certainly think they should be taken seriously.

Mr. Runciman: I may be wrong on this, but I guess some people suspect we are seeing–and you believe strongly that we are starting to see–the effects, but it is not that many years ago they were predicting that we would enter another ice age, if you recall. So I think there is some reluctance out there.

I was listening to a news report recently–it just leaves one feeling frustrated, I guess, in terms of the long-term future–in which they were talking about forest fires in Brazil contributing about 10 per cent of air pollutants right now, and the government of Brazil does not seem to have any interest in containing those fires, which seem to be an annual event. That is the sort of thing we are faced with now. We can do something in our own jurisdictions, but we are significantly

limited in what we can do to contain this situation.

Dr. Hare: I agree entirely. You cannot do anything about this unless action is taken on a world scale. However, if I were the chief executive officer of a big public utility that had to make the choice as to what forms of energy to back and I were faced with the possibility that the world would arrive at some kind of convention in the next 20 years calling for a reduction in fossil fuel consumption, I would want that fact to be on the table when I made my decision to build another fossil fuel plant.

I do not feel confident about this. In fact, I was extremely tentative. My actual words are these, "I should like to express the personal view, based on long experience rather than personal research, that we are indeed witnessing the beginnings of the process." The delegates did not come to the conference to chase a will-o'-the-wisp. I did not bang on the table and say they had better get cracking.

I merely think that in the long-term planning of capital investment pertaining to navigation works, power installations and other things that involve spending money that is going to be useful 50 years downstream, people ought to take into account the possibility that this climatic change is coming. It is not a certainty by a long shot, but I am sufficiently confident of it to feel that it is about time it was on the political agenda and on the management agenda for those people who manage very long-term projects.

Mrs. LeBourdais: I found this paper immensely readable. Coming to it from the perspective of a layperson, I think it gave me a very good overview. One thing I was not aware of was that you refer to a natural greenhouse effect, which presumably is a good thing and helps to keep a balance among the ecosystems. How does one begin to measure where that natural greenhouse effect stops and where our refuse and garbage that we are putting into the air begins?

Dr. Hare: In several ways. First of all, the surface temperature of the earth averages 15 degrees Celsius at the moment. It has gone up a little bit. It is about 15.5 and it used to be 14.8, that sort of thing.

We do measure world temperatures. World temperatures so far have been dominated by the natural greenhouse effect. If the greenhouse effect is increased by adding these contaminants to the atmosphere, then it should show itself by a rise in surface temperature. We do monitor that.

It has in fact gone up continuously from 18[illegible] right through to the present time, but with a lot [illegible] embroidery on it. It is continuous in the sense th[illegible] you can see the trend there but there a[illegible] substantial differences from one year to the nex[illegible] That is the first point.

Second, we do measure atmospheric compos[illegible]tion on a worldwide basis. We measure carb[illegible] dioxide accurately. It is currently 349 parts p[illegible] million. When I was an undergraduate, it w[illegible] about 309 parts per million. It has gone up th[illegible] much.

Each of the other gases is increasing. Methan[illegible] is increasing at the rate of about 1.5 per cent p[illegible] annum, which on a world scale is a tremendous[illegible] rapid change. We take account of it essentially b[illegible] measuring the changes that will show i[illegible] presence. I wish we could say we did it mo[illegible] thoroughly but it is always an uphill struggle [illegible] get government money to monitor long-tim[illegible] trends.

Mrs. LeBourdais: I do not know if this is th[illegible] way to express it, but regarding the depth of th[illegible] greenhouse effect or the depth of that layer, do[illegible] it vary around the world based on the heavil[illegible] populated areas and more industrial areas or d[illegible] winds move that around so much that it begins [illegible] be equalized around the world?

Dr. Hare: The winds move it around ve[illegible] efficiently indeed. You may have local smo[illegible] conditions where the proportion of these gase[illegible] rises for a short time above the normal level, b[illegible] the winds are amazingly effective in doing this. [illegible] you release an identifiable contaminant in th[illegible] northern hemisphere, within six months to 1[illegible] months they will probably identify it at the sout[illegible] pole.

Mrs. LeBourdais: One more question. Agai[illegible] as a layperson, I guess I blame that greenhous[illegible] effect primarily on ozone. I am confused as t[illegible] whether there is still an increase in ozone or [illegible] decrease, but you are saying that the mo[illegible] important gas would be carbon dioxide fro[illegible] fossil fuel consumption.

Dr. Hare: That is correct. The most importa[illegible] greenhouse gas is water vapour, your ordinar[illegible] common or garden humidity. The next in line i[illegible] carbon dioxide. The third is probably th[illegible] chlorofluorocarbons, which are synthetic. The[illegible] are very amazingly efficient. There is very littl[illegible] of them in the atmosphere, about 60 million ton[illegible] or something like that spread right around th[illegible] world.

Mrs. LeBourdais: Which of the three woul[illegible] you feel would be easiest for us to attack t[illegible] reduce in quantity?

Dr. Hare: Without any doubt the chlorofluorocarbons. They are completely synthetic. If you can find a substitute for them in refrigerators, you can stop it completely, although it will still take 50 to 100 years for the atmosphere to cleanse itself of the gases that have already been released.

The carbon dioxide is a toughie because to cut that back, you have to cut back on fossil fuels. It is the only reasonable way. Water vapour you certainly cannot control. There is too much of it and it is too necessary for other purposes. Ozone is very important in this story but it is very complicated. It is actually decreasing in the lower stratosphere, particularly near the Antarctic in the spring; but it is tending to increase in the lower atmosphere as the result of better penetration of ultraviolet rays, and also as the result of urban pollution which tends to create conditions favourable to the creation of ozone.

1150

Mrs. LeBourdais: The most recent gas to have publicity in the last couple of weeks is called radon, I believe, and is being found very much in American homes, less so in Canadian homes. Does that particular gas come into this picture?

Dr. Hare: It does not affect this climatic picture, no. But it is a very important question, a public health issue. There is no doubt that it has been underestimated. Radon is a very substantial part of the background radiation reaching all of us, or at least those of us who have cellars and so on in which it occurs. It contributes perhaps as much as half of the background radiation, which is very much greater than most people will ever be exposed to from a nuclear reactor. The stuff just oozes out of the soil into your basement. It is a very heavy gas.

Mrs. LeBourdais: Apparently that has been going on for some time, yet we are just beginning to hear about it in any depth.

Dr. Hare: It has been known about, of course, for a very long time, but it was thought of as a gas that accumulated in uranium mines. Well, it accumulates in basements and not uranium mines if you put your house in the wrong place and build it in the wrong way.

Mr. Cureatz: Just to make the Ontario Hydro officials have a happy lunch, I guess what you are telling us is that if we are going to decrease the amount of water turning the turbines and we do not want coal, oil or gas-fired stations putting pollutants up into the air, but if we still want electricity, and if you are going to spend a lot of money to make it, nuclear power would appear to be the way to go in Ontario.

Dr. Hare: I certainly do not think that the province should abandon its nuclear capability. I am torn. I think 70 per cent is a dangerously high proportion of eggs to put in one basket. On the other hand, it is true that nuclear technology does not contribute to the greenhouse effect, not at all. It is also true that the greenhouse effect suggests a threat to hydroelectric supplies. I am just glad I am 69 and do not have to solve that problem.

Mr. Argue: I have just one brief question on your discussion of the recommendation to reduce fossil fuels in the developed world by 20 per cent. Since we are considering electricity planning issues before the committee and fossil fuels have been suggested as one option for the province, I know there are several industrial processes with which electricity cannot be competitive in replacing the use of fossil fuels either for technical reasons or for reasons of cost. I was wondering whether you had considered such processes as cogeneration, for example, for improving the efficiency and the worth of the use of fossil fuels, in attempting at the very least, if we are using fossil fuels, to get more bang for the buck, so to speak?

Dr. Hare: I am solidly in favour of energy conservation, of cogeneration, of all the measures that increase the efficiency with which we use existing energy. I think the days in which you could simply minimize your costs by using as much energy as possible have long gone by and I entirely agree with the environmentalist lobby that says it makes sense on every count to do all the things you can to avoid the construction of new, very costly, capital-intensive generating capacity.

However, having said that, I personally doubt whether conservation and cogeneration can release enough energy into the system to meet the expansion of the Ontario economy. I am speaking now as an individual. This is not in either of these two reports. I think we should do everything we conceivably can to get more bang for the buck or to get more kilowatt-hours out of unit of fuel consumed, whatever the form. On the other hand, I also suggest that the chairman of Ontario Hydro is right when he says that we shall not be able to solve the long-term energy interests here solely by conservation. It will be necessary, I am sure, to develop more installed capacity on a large-plant basis.

I personally dislike large plants. I would vastly prefer to see the province covered with more locally generated capacity, more small-scale

generating capacity, but that also has so far seemed to be an increase in costs. I am not by any means sure that it would be. I agree that small is beautiful and I agree that conservation is an excellent option, but I doubt whether it can meet all our requirements.

Mr. Chairman: Mr. Yeager, do you have a short question?

Mr. Yeager: Yes. Because the greenhouse effect has become a popular newspaper and television subject recently, there might be some tendency to treat it as the latest flap, but I recall doing my grade 8 science project on the greenhouse effect. It is not something that scientists have been thinking about for only the last five years, is it? You have been thinking about it for a long time.

Dr. Hare: My very first sentence in this paper starts, "In 1938 a British air pollution specialist...." He was not the first, but he was the first person to say this may become an engineering problem. That was when I was an undergraduate. Yes, it has been high on my personal agenda for the whole of my professional life, but it has only been within the last couple of years that anybody has listened.

I do not think this is a flap; I think this is for real. The greenhouse effect, and, more generally, the whole question of the disturbance of atmospheric chemistry, is one of the really big environmental issues that has major economic overtones. In other words, it is not something that we are going to get away with, without incurring added costs: added health costs as well as added economic costs. It simply is not going to go away, which is why I never lose an opportunity to try to convert people like yourselves.

Mr. Chairman: Dr. Hare, I promised to adjourn by noon. I think I have accomplished that. I would like to thank you on behalf of the committee for coming in and speaking to us today on both your report and the greenhouse effect. You have given us many very useful and helpful insights as we deliberate on our problems here. Thank you again for coming in.

I will adjourn the committee until two o'clock.

The committee recessed at 11:58 a.m.

AFTERNOON SITTING

The committee resumed at 2:08 p.m. in room 228.

Mr. Chairman: I call the afternoon session to order. For the benefit of the members of the committee, we have now received two of the reports Dr. Litchfield referred to in his briefing last week. You have them on your desks before you and are free to look at them on your own time. As you will recall, he did refer to them in his presentation and agreed to send them on to us.

Our first witnesses this afternoon are some representatives from TransCanada PipeLines and Consumers' Gas. Mr. Russell, I guess you are the head of the panel. Perhaps I could ask you to introduce your confrère and I will turn the floor over to you.

TRANSCANADA PIPELINES LTD.
CONSUMERS' GAS CO. LTD.

Mr. Russell: I should perhaps start by introducing myself, Dave Russell. I am director of project developments with TransCanada Pipelines. With me this afternoon is Frank Dixon, who is the manager of new business development with Consumers' Gas Co.

We would like to talk to you about a proposal we are making to Ontario Hydro for a combined-cycle plant operation, which is in fact drawn from our experience with a project we expect to start constructing in the next month or two down in Rhode Island. I propose to lead you briefly through the project in Rhode Island–because that is real, you will see what is involved there–and then draw the parallels with what is being done or what is proposed to be done here in Ontario.

I am going to use, if I may, the slide projector. This presentation should not take long. I will introduce you to Ocean State Power and then Frank Dixon will introduce you to our proposals for the Hearn plant. We will report a little bit on where we are with respect to progress. Naturally, at the end we hope to enlist the endorsement of this committee for, if not our project, then at least the principle.

Ocean State Power is a 500-megawatt combined-cycle generating plant to be located in Burrillville, Rhode Island, fuelled by Alberta natural gas. As I indicated to you earlier, we expect to start construction in the next month or two. The delay in starting construction is related only to some permitting requirements which we are still receiving down in the US. The plant should be in operation in late 1990.

This is an artist's conception of what it will look like. As you can see, it is located in a semi-rural area, next to an adjacent power line. This is a picture of one phase of the plant or roughly 250 megawatts. Just to put it in perspective and because I want to come back to some cost factors later, the plant is located in the north-central part of Rhode Island, which is outlined in red on the map. As you can see, that is several hundred miles east of Niagara Falls, which is where the gas is delivered to the United States for the plant.

The plant, as I said, will be built in two phases of 250 megawatts each. It is designed to dispatch on a totally economic basis only. I can come back and talk about that in more detail if that is necessary for the committee. As a result of examining and analysing the New England Power Pool in some detail, we are convinced that the operation of this particular plant will be essentially a base-load operation which will give us a very high load factor, in excess of 80 or 90 per cent. We have incentives on our power sales contracts with the power buyers with respect to the output power that comes from the plant, together with the availability associated with the plant.

In summary, the investors in the project are ourselves, TransCanada PipeLines. We are the lead investor and the original developer of the proposal, along with an associate of ours, J. Makowski Associates in Boston. Some of the power buyers elected to become investors in the project also, and we have investments from New England Electric Systems, Eastern Utilities Associates and Newport Electric System.

The plant is expected to cost, or I should say was expected to cost, $175 million for the first phase. It will actually be a little more than that now, because we have been a bit delayed with our environmental permitting. The second phase is somewhat less. We have signed contracts for the delivery of the equipment and construction of the plant with General Electric. They are also going to be, initially at least, the operators of the plant under contract to us.

The power sales contracts are with a variety of utilities, including the three that are investing in the plant, but the biggest purchaser outside them is Boston Edison. In the first phase, they buy nearly half of the power which will be available. When we combine the second phase, which will probably come on line in less than a year after the

first phase, some time in 1991, the contracts are being rearranged to give the distribution you see there, and at that point New England Electric Systems becomes the major purchaser of power.

The term of all of these contracts is for 20 years. The first, which was with Boston Edison, was signed in December 1985, and at that time the price for power was expected to be about seven cents a kilowatt-hour. It is turning out, at the moment, to be about 5.6 cents a kilowatt-hour delivered in Rhode Island.

The gas contracts to match this come from two sources. For the first phase, we are buying gas from a consortium of producers in Alberta operating under the ProGas umbrella. For the second phase, we have signed contracts with ProGas and Western Gas Marketing Ltd., the marketing arm of TransCanada PipeLines.

The gas for phase 2 is to be the subject of a hearing before the National Energy Board which is taking place in Calgary next month. The price originally negotiated for the gas was US$3.35 per MCF at Niagara Falls, which was effective December 31 or January 1, 1986. Today that price is approximately $2.35. The price varies according to the basket of fossil fuels burned within the New England Power Pool. Again, the term of the contracts is 20 years. That is important because we had to have the long-term contracts in order to gain financing for the project.

The gas producers like the project because it is an incremental gas market. It would not otherwise have been served by gas had we not generated this particular project. It is expected to have a high load factor on the gas sale, and in fact the gas sales contract will likely operate at a higher load factor than the electric purchase contract. The price for the gas from their point of view is competitive in the marketplace. Not only that, but by all calculations, it is competitive back in Alberta. So we expect them to be quite happy with this contract over the 20 years.

Finally, it is a long-term contract which they can add to their portfolio. In fact, this was the first 20-year contract which had been negotiated in the gas industry for some 15 or 20 years.

The power buyers, of course, have a different set of reasons for being interested in this concept. Being investor-owned utilities, they were interested in the possibility of nonregulated investment. They were very attracted to the short lead time of the project, even though, I must admit, at this point it does not seem to have been that short in dealing with the US regulatory system; but it is still a lot shorter than any coal plants or, if they could do it, nuclear plants would have been in that area. The power is competitively priced for them and consequently on an economic dispatch basis it will operate at a high load factor.

It has minimum environmental impact. This is evidenced by the fact that we have been through an environmental hearing in the US, which was only initiated just over a year ago, and the ruling is expected next Thursday. We are quite confident that we will have a positive ruling. I should say that if a year does not sound very short, by comparison most of these events take at least two years to roll through. So it gives you some idea that it has a fairly easy ride.

Also, from the point of view of the power buyers, it is a new source of base-load energy. They are looking to diversify their sources of energy. They were very dependent and still are very dependent on imported oil, coal and nuclear power and they wanted to add gas to their portfolio. So we took the experience that we gained in this particular project over the last four years and, together with Consumers' Gas, have been putting that experience into discussions with our friends at Ontario Hydro, which is leading to a proposal for a plant at the R. L. Hearn site. Frank Dixon will describe to you what we propose to do at the Hearn site and where we have got to.

1420

Mr. Dixon: Here is a photograph of the R. L. Hearn site, if you are not familiar with it. It is very close to here; it is in Toronto. It is one of the older fossil-fired generating stations on Ontario Hydro's system. It is capable of producing about 1,200 megawatts, and its present status is that it is in a mothballed condition. It is near the end of its useful life. That is one of the things that attracted us to this particular site.

Our consideration with TransCanada PipeLines was, if you were going to build an Ocean State type of facility in Ontario, if it were applicable here, what would be one of the better places that you could put it? This site just stands right out. It is already in a very good location for a power plant, and the equipment on the site is relatively obsolete.

This is the essence of our proposal to Ontario Hydro. We have come to a definition of it at this stage in our discussions. It bears in mind what features of the project would be most attractive to Ontario Hydro. The size of the plant that we have in mind is 1,000 megawatts, and it would be built and owned by TransCanada PipeLines and Consumers' Gas together. It can be started up and in service in the period between 1992 and

1994 in a sequence of four 250-megawatt phases that would match the Ocean State project almost exactly. It would be very close to the type of equipment that has already been specified and installed at Ocean State.

We have taken into consideration Hydro's need to be able to dispatch the production from this plant, as opposed to operate it as a base-load plant, and we have considered the ability to supply gas to the plant on that basis. We consider that to be feasible, so we are able to include that in the proposal.

Similar to Ocean State, we are looking at a 20-year power sales agreement that is required. One of the important considerations for Hydro is that in making a proposal to it, we should be able to offer a firm price that we can stay with today and have it indexed to electricity. This is to overcome some of Hydro's concerns about the risk of the price of natural gas causing the power from the plant to be high in price at some point during its life. We are now able to confirm that we can make that a part of our offer also.

This is a schematic of a combined-cycle unit to show how it integrates with the Hearn site at present. The existing Hearn generating plant is contained in a large building. We are not considering using any of the facilities that are associated with that–the old boilers, the old turbines or the old equipment that is contained in there. We are independent from that. We would be located on real estate that is outside of that building on the existing Hearn site. We would, however, put power into Ontario Hydro's existing transmission lines that are right there, and there is a considerable cost saving from doing that.

The schematic simply shows combined-cycle technology, which you have heard about before. It is two gas turbines producing electric power. The exhaust from those turbines goes into a heat recovery steam generator which produces steam and, in turn, produces some additional power, as in cogeneration. This is not a cogeneration unit. It is totally dedicated to producing electric power, its advantage being that it is very efficient. It uses much less gas to produce the same amount of power than would a simple cycle. It is combined cycle.

This is a comparison of the two sites to indicate the extreme advantage of the R. L. Hearn site over the Ocean State site. We are able to locate at least 1,000 megawatts of combined-cycle power on the site. The gas supply system to the Hearn site already exists because that station was converted to natural gas in the 1970s. Consumers' Gas has provided gas to that site in the past; so to install combined cycle simply means some upgrading of the existing facilities to get there. It would include some upgrading of facilities on the system of TransCanada PipeLines also.

The aspect of cooling: In the case of Ocean State, required cooling water has to be brought from some distance because it is not located on the water. The Hearn site is on the water and already has access to considerable cooling facilities in the civil works associated with that. Also, as you saw in the photograph, there are a number of oil tanks in the area that are available for use for storing oil that can be used in the peak period for the interruptible gas supply. I will get to some of the rationale for that a little later on.

Oil firing is an important part of maintaining reliability and economizing on the fuel supply to these plants. The switchyard and transmission, as I have mentioned previously, already exist, so we are taking advantage of that. The essence of this is that our capital costs of installing the facility should be considerably lower than what you have seen for Ocean State.

Here are what we see as the major benefits to Ontario of this type of project. As far as the pricing goes, we feel that it is economically competitive with other supply options that are in the wind. It certainly is more economical than construction of a new coal-fired facility with the proper environmental controls on it.

From what we have heard about what power is being offered for in the power market from Hydro-Québec, it is certainly much more economical than that. We believe that it is more economical than retrofitting with flue gas desulphurization and rehabilitation of some of the existing coal plants. So we feel it will be a very economical new resource that is available. Also, the aspect of its using gas and gas/oil in combination produces some additional diversity in the fuel supply, which in turn is a measure of security and not having all your eggs in one basket.

There are some synergies with the gas supply system in that Consumers' Gas would love to attach lots of customers that will do exactly this thing. This is an interruptible customer. The benefit of having more interruptible customers or a large interruptible customer on the system is that Consumers' is able to interrupt the flow of gas to the plant on the coldest days in the winter and get that gas back into the system to supply the peak requirements. There is an operating synergy with the gas supply system that can be taken

advantage of here; it is ultimately going to benefit the gas customers.

As I said previously, the cost is reasonably low and competitive. We cannot tell you too much in detail relative to the pricing that we are proposing at present, but we can say that it is very close to what it costs to produce power in Ontario today. Most likely it will remain close to that if it is indexed to electric power. We do not see any potential upside adverse effect on the cost of power to the ratepayers in Ontario.

Finally, one of the real bonuses with this type of plant is the environmental benefit. Environmentally, they are very clean and superior to some of the alternative technologies that are available for major generating stations. I have a few slides just to illustrate that.

This slide illustrates the environmental emissions to the atmosphere of sulphur dioxides, nitrogen oxides and particulates that are associated with three different types of generating stations: an existing coal-fired plant operating on 1.8 per cent sulphur coal, an existing coal plant that would be retrofitted with flue gas desulphurization scrubbers for the purpose of reducing the sulphur dioxide emissions and our combined-cycle plant, all of the same size–this illustration is per 500 megawatts–all operating for the same amount of time during the year.

1430

You can see that in terms of sulphur dioxide, the scrubbers will reduce the output from 60,000 tonnes to 9,000 tonnes a year. In the case of combined cycle, since it is fired on natural gas, with possibly a small amount of oil, we would expect it to be down in the range of 100 tonnes a year, which is negligible.

Nitrogen oxides: The existing coal plant would produce about 5,500 tonnes a year. They would actually go up slightly with retrofit scrubbers. Let's put it this way: The retrofit scrubbers would not have a major effect on reducing nitrogen oxide, whereas the combined-cycle plant produces substantially less nitrogen oxide per unit energy produced.

Particulates: The combined-cycle plant has practically none, whereas the scrubbers and the existing coal plant still have substantial particulates, even when the plant has electrostatic precipitators for collecting the dust.

The purpose of retrofitting scrubbers is essentially aimed at reducing sulphur dioxide. However, there are other emissions from power plants to be considered, so we have an illustration here of those same three cases. The amount of waste, solid material, that comes from the plants–and, typically, with coal plants ash is the major disposal problem–is 115,000 tonnes per year with an existing, typical coal plant. That would increase somewhat in the case of retrofitting with scrubbers, because the plants become less efficient and they need a little more coal to be burned. The combined-cycle plant, again, has none of that. We are using the gaseous and liquid fuel.

In terms of sludge, I would say that is an additional output of material that has to be disposed of as part of a typical retrofit scrubber program in which you have a disposable type of system. There is an additional 275,000 tonnes of material that you would get with the scrubbers. Again, we are negligible, zero, with the combined-cycle plant.

The other emission that may be of concern is the amount of heat that goes to heating up the cooling water that is used in these plants. You can see it is similar for the first two cases. In the case of the combined-cycle plant, because of the efficiency of the plant, it is very, very low.

The only other emission that we have not mentioned on these slides and that has been under recent discussion is carbon dioxide and the greenhouse effect. In the case of combined-cycle plants, the carbon dioxide emissions are less than a half of what comes out of a coal plant. On the basis of the environmental effect, this is what we mean by environmental benefit. The substitution of one of these plants for either a retrofit scrubber coal plant or a coal plant, in terms of its operation, would be extremely beneficial to the overall, global environment in Ontario.

This is an illustration that I will go through quickly. It is to indicate why the economics and the environmental effects are synergistic. Column 1 is roughly the order in which generating resources would be utilized. Typically, that is the way the Ontario system would operate today. The highest priority would be on purchases of power that are committed to under firm contracts, such as from parallel generators, other utilities or the like; following that, hydraulic power, nuclear power; then lower priority, less utilization in coal, oil and gas, being similar at the top end.

If those resources were to be dispatched on an emissions basis, as opposed to economy–in other words, if you did not care what the cost of running the system at any particular point in time was, but you did care how much you were emitting in terms of emissions, you would likely reverse the order of the last three. In other words,

you would burn gas before you would burn oil. You would burn oil before you would burn coal.

The effect of introducing combined-cycle gas, because of its economy, its efficiency and its high-load factor, is that the cost of operating these plants is going to be more economical than scrubbed coal or coal. Therefore, they would probably fall into the order of things right after nuclear and before coal and oil and gas.

What this means is that the likely economic dispatch–the operation of the system–would be much more closely aligned with the least emissions dispatched than the typical economic dispatch. Therefore, that is how those environmental benefits would be obtained.

Here is what we feel, in summary, is the rationale for Hydro's working with us on this project. It provides the diversity, as I mentioned before. We do have a short lead time relative to the lead time in major plants of this nature. We have, I think, overcome the potential objection of fuel supply cost risk by saying we will privately own it, we will privately look after the fuel supply and we will absorb that.

We feel the price will be competitive, as I mentioned before, with many other options. It is an opportunity that is available right now. The project is significant enough in size to have impact on some of the major upcoming decisions in the 1990s that Hydro will be facing.

I mentioned the environmental impact. One of the advantages of building on this site now will be to maintain the Hearn site as a part of the generating system.

It has some strategic importance, not only from that point of view but from the point of view of having a major source of power close to where the major loads are. So the savings in the transmission are another strategic advantage. Those are what we feel are some of the major reasons that Hydro should feel good about this deal.

This is a summary of the progress of the discussions that we have had with Hydro to date. In 1987 we had quite a few technical discussions reviewing the availability of the facilities on the site and various technical options. We also reviewed this concept with gas producers, the Ontario and Alberta Energy ministries and the Ontario Ministry of the Environment, basically to look for any policy problems or policy implications of proposing this type of plant. We found everything, at that point, relatively feasible. In other words, there were no major stumbling blocks.

Early in 1988 we made some preliminary concept proposals to Mr. Franklin. Our two presidents, Gerry Maier and Bob Martin, had a meeting with him to discuss this concept and assess his level of interest. From that point, we have been involved in discussions of the concept and alternatives to that concept with a cross-section of Hydro's management. That was Mr. Franklin's suggestion.

As a result of those discussions, we have revised the concept as to the size, the timing and the type of operation that is available and tried to take into account as many of Hydro's needs as it had identified, particularly with respect to this pricing risk.

We are now at the stage where we feel we have a fairly good definition of the project and its operation. Quite soon we will be presenting a formal proposal to Hydro. We would expect a response in this respect by year-end.

Our recommendation to this committee is that you take a look at this concept of significant gas-fired independent power, the benefits of it, and endorse it as part of Ontario's energy supply strategy. That is basically what we would ask you to do. We are open to any questions.

1440

Mr. Runciman: How long has Hearn been mothballed or out of production?

Mr. Dixon: I am not sure. For the past several years it has not been in active operation.

Mr. Runciman: Your original proposal to Hydro was for a 250-megawatt plant. Were you convinced to increase the production available out of that facility?

Mr. Dixon: We tested out the concept with a 250-megawatt proposition, yes. We were looking at 250 megawatts on a faster time frame than you saw there. We were looking at options to increase the size at that point, but we had some firm pricing associated with 250 megawatts. Following the discussions, we are able to wrap the whole thing up into a 1,000-megawatt package and put forward firm pricing for 1,000.

Mr. Runciman: It is feasible at some point in the foreseeable future, if this goes ahead, that the output could be increased. I am sure at some point there is a limiting factor, but the plant currently produces 1,200 megawatts, you said.

Mr. Dixon: Yes. The limiting factor probably is about 1,200 megawatts for the site without increasing the transmission capability from the site by some other project, but we have limited ourselves to something less than that for the time being.

Mr. Runciman: What arrangement are you proposing in respect of the ownership of the property? Would there be some sort of leasing arrangement or how would that work?

Mr. Dixon: We would lease it from Hydro.

Mr. Runciman: Over the period of the contract?

Mr. Russell: Yes.

Mr. Runciman: You talked about interruptible supply in this proposal and said you were going to continue to use oil during those periods of peak gas usage. What is the track record in that respect? How many days would be involved on average if you looked over the past number of years? How many days are we talking about when the gas supply would be interrupted?

Mr. Dixon: In Consumers' system, we have had years when there was no interruption at all and there have been periods of interruption in the region of five or six days for some customers. It varies from customer to customer and it is dependent on the size of the customer and the like. It will be relatively small, in our estimation, but it is very weather-dependent.

Mr. Russell: I think the other thing you should recognize, though, is that the possibility of interruption is–how can I put it?–a deliberate policy on our part because it makes the fuel cost of the plant more economical. If we were required to do so, we could have a firm delivery of fuel to the plant, but that is not our choice. In the case of the Ocean State project, which we were referring to, there is a continuous and uninterrupted supply of gas to the plant.

Mr. Runciman: Regarding lead time with respect to this, you have indicated that you could phase in full production over the period of time from 1992 to 1994. What is required in respect of approvals for this sort of thing? In some respects it is a conversion, although you are constructing a new facility, I gather. I am just wondering what kinds of approvals you would require for it.

Mr. Russell: We would anticipate that, as far as the plant site is concerned, there would be some form of environmental approval that would have to be obtained. Beyond that, the approvals relate more to our normal course of doing business, from our perspective at least; persuading the National Energy Board that we have to put in some more pipe if that is necessary and things like that.

Mr. Runciman: The projection in terms of being up and running was not really taking into account what requirements the Ministry of the Environment of this province might place on you.

Mr. Russell: We had presumed that, given the relatively benign nature of the plant, it would be possible to gain the approvals from the ministry within a period of about a year.

Mr. Runciman: If this flies, are your firms interested in doing ventures comparable to Ocean State, where you are not going into an already-established site but constructing new facilities? Is there any interest in the long haul in that sort of option?

Mr. Russell: Yes. I have to say that we do not intend to be–how can I put it?–a power-generating competitor to Ontario Hydro or to any other electric utility, from that point of view. Our original rationale for getting into the investment in power plants–the first one will be the Ocean State plant–was more related to the cost or to sort of a marketing opportunity for extending our business of moving gas and selling gas into different markets.

Our investment there was an interesting requirement to sort of balance off perceived political risk and things like that with respect to the buyers, as much as we wanted to see them investing from our own perspective. In Ontario, I think we are proposing this plant and are proposing investing in this plant because we see this as a very good way of removing from Ontario Hydro what we perceive to be the fears it potentially has of using gas as a fuel in power plants.

Mr. Runciman: I see.

Mr. Russell: After we have run this and have made our point, then maybe they will build the plants themselves, but we would be quite happy if they wanted us to look at other locations. I do not think we are restricted; neither are we overly ambitious, just anxious to continue doing business to the mutual benefit of ourselves and Hydro.

Mrs. Sullivan: I wonder if you could give us an approximation of what kind of capital investment you would be making in that plant. Would you be recovering that through a rate? I suppose this is all part of negotiations that you cannot talk about too much.

Mr. Russell: I would prefer, if you do not mind, to refer to the costs of the investment in Ocean State and draw comparisons with that rather than to talk precisely about numbers which we may or may not think are appropriate at the Hearn plant. As you saw on the slide up there, we anticipate US$175 million for the first 250

megawatts in Rhode Island. Actually, that number excludes some financing charges so, rounding it out, around $200 million.

Obviously there is not an awful lot of difference in building a plant in Rhode Island compared to building a plant in Ontario. There may be some, but not a great deal. The differences that do exist, though, were highlighted on that slide Mr. Dixon talked to. We compared Ocean State with the Hearn plant. In the Rhode Island case, we have to make some considerable expenditures on water, oil and gas pipelines, which would not be the case at the Hearn plant site.

I think you can look at the number in the US and assume it is not very different here, but it is going to be a little less. In terms of how we would recover that money, yes, it would be out of the contract that we would hope to negotiate with Ontario Hydro.

Mrs. Sullivan: The other question is, given the shorter lead time to move this plant into operation, am I right in assuming that there would not be any necessity for an environmental assessment because of the site itself, or would there be one?

Mr. Russell: We would be delighted if there were not one, but I suspect there would be an assessment process of some sort. I cannot believe that we would be able to build a facility of this magnitude without some environmental review.

Mrs. Sullivan: In that case, one of the things we have been hearing on a consistent basis throughout these hearings is the time that those environmental assessment hearings take to proceed. Presumably you come to an arrangement with Hydro at the end of this year, do you still think there would be lead time to be in operation in 1992 for the first phase?

1450

Mr. Russell: If I can put it in another perspective, it would take roughly two years to construct the plant, maybe a little more or a little less. That is definite. If it takes three or four years or one year, whatever the time is, to achieve whatever degree of approval is required to enable us to go ahead, then we would have to add that to the construction time to give us a total lead time.

As I pointed out to you earlier, our experience in the US was in a far more complex environment. We were dealing not only with the state of Rhode Island but because we were right up at the northern edge, close to the southern border of Massachusetts, we also had to satisfy the good citizens of Massachusetts, and in the process we had to satisfy some federal bodies too.

We think we have managed to achieve that–I will tell you next week–in a little over a year. So it does not seem unreasonable that, given a less complex environment, it should be achievable in that kind of time.

Mr. McGuigan: There has been a question on a generic type, a combined cycle. Is this unique to gas or could any thermal power use a combined cycle?

Mr. Russell: It is not unique to gas. Any prime mover which has a high-enough exhaust temperature could, if it were large enough, essentially be adapted to the same kind of technology. Plants of the type that we are talking about, in fact, are operating–I am trying to remember the name of the utility–in Massachusetts. They are fired on oil with occasional firing on gas.

It happens to be the other way around there. They are used largely in a sort of seasonal peaking operation rather than a base-load operation down there. If you have a prime mover with a high-enough exhaust temperature and a large-enough exhaust mass flow, you can recover heat, generate steam and run a steam turbine.

Mr. McGuigan: So it could probably be used for coal as well as for gas?

Mr. Dixon: These plants in the US are actually certified to be coal-capable, I believe.

Mr. Russell: Yes. I was trying to think how else to answer your question. One of the permits or approvals we have had to gain in the US has to do with the Power Plant and Industrial Fuel Use Act, which relates to whether gas is a suitable fuel for generating electricity or whether, at least in the eyes of the coal lobby, it should be strictly coal as a fossil fuel.

The position, I think, which the economic regulatory authority has come to in the US is that it has defined units as being coal-capable, if in the future you decide that you can take coal and gasify it to produce gas and you run the gas as a fuel in the gas turbine. The equipment we propose to install in Rhode Island is under that definition of coal-capable and, since it is the same as we would be referring to here, it would be equally possible in the future to put a coal treatment plant on the front end and produce gas from the coal to produce a fuel for this kind of plant.

Mr. McGuigan: Which really means that you would use turbines rather than boilers.

Mr. Russell: Yes. The only boiler we are using is the boiler which converts the exhaust heat or the exhaust gases from the gas turbines into steam.

Mr. McGuigan: What is the relative increase in efficiency as compared to a single-phase type?

Mr. Russell: It is difficult to say precisely, but I would expect that the simple-cycle turbines would operate at approximately 30 per cent efficiency. Looking at the useful power generated compared to the energy burned within the plant, that is an overall thermal efficiency; and that, when you convert it to combined cycle, would change from, as I say, approximately 30 per cent to approximately 45 per cent. So it is about a 50 per cent increase.

But the interesting thing is, as your turbines become more efficient the exhaust temperature goes down, so you gain a little less on the steam cycle. That is where it is hard to generalize, but that is in order of magnitude.

Mr. Charlton: There is just one question that I have. It basically flows out of the questions that Mrs. Sullivan asked you about environmental approvals. I certainly understand your comment that you would prefer if there were none, simply because of cost. I understand that. You view this as a fairly benign technology.

But it seems to me that what you are expressing in this project is a desire to sell Hydro on a concept and a pricing package, as well as ending up with a plant that you are going to operate and sell Hydro power from. Am I correct in taking that out of what you have said? Your real purpose in this is to sell the combined cycle gas concept to Hydro as an acceptable and economic one?

Mr. Russell: I would have phrased it a little differently. We clearly believe the combined-cycle technology to be acceptable and economic. I think what we would be trying to sell Hydro on would be the desirability of a contract which results from our using that technology.

Mr. Charlton: What I was getting at, though, was your comment earlier about convincing Hydro from the perspective of its perhaps building plants in the future, using the same technology and using gas out of the TransCanada pipeline.

Mr. Russell: We would certainly be happy to sell them gas.

Mr. Dixon: That is not our primary objective, though. Our primary objective in the case of this plant is to take advantage of the business opportunity on the Hearn site at the present moment. It does not require Hydro to decide to build those kinds of plants in the future. Hydro may decide to do that if it finds that what we are doing is very feasible and attractive, but this is not a sales effort.

Mr. Charlton: I understand that in the purest sense, but certainly your comments indicated that you were trying to convince Hydro of something around this project, as well as making the project work itself.

Mr. Russell: Maybe I stressed it the wrong way. Our perception is that Hydro perhaps was not interested in this concept. We believed it to be a valuable one and viable, and therefore a good business opportunity, so we were willing to offer it to them.

Mr. Charlton: The extension to what I am getting at refers back to your comments about the environmental approvals. As you are well aware, Hydro has and feels significant difficulty around some of the approvals processes that it has to go through. In their looking at where they go for the future in terms of supply capacity and generation capacity, they know, for example, that the proposal for the next nuclear plant is going to go through one God-awful environmental ruckus. They know they are having difficulties with transmission proposals in terms of the approval processes.

From that perspective, might it not be useful, even if it adds a little bit of time to your proposal, to consider taking it through a full environmental assessment process and coming out the other end reasonably cleanly in a reasonably manageably short time as part of demonstrating one of the advantages of the technology itself?

Mr. Dixon: I do not believe we have any objection to an environmental assessment of the plant. As a matter of fact, the plant would probably fare very well, as we have shown, in any environmental assessment. I think your point about time is the major consideration. Any process that I think met our concerns with respect to controllability of time would work.

Mr. Charlton: So there are not going to be any major efforts for exemptions?

Mr. Russell: I would expect we would have a major effort for acceptance rather than exemptions, or at least acceptance of the technology.

1500

Mr. Runciman: I have a quick question. I am curious about your negotiations with Ontario Hydro. You are rather optimistic, I take it; or maybe I am reading too much into your comments. If there is any reluctance at Hydro,

what is it centring on? Are you meeting any resistance or reluctance about that particular aspect, the concept that rather than operating their own generating facility, such a significant generating facility, this would be in the hands of someone else?

Mr. Russell: I would not characterize any of the discussions or negotiations we have had as highlighting that as an issue. My view of our discussions up to now is that they have been very similar in some respects to many of the discussions we had with the New England utilities when we first talked to them. Traditionally, the gas and electrical industries have not been dancing partners, as it were. There is a gulf to be bridged there, but I would have said the discussions we have had with the people in Ontario Hydro have been straightforward and businesslike.

Mr. Runciman: But you would not say you are optimistic?

Mr. Russell: I would not say I am unoptimistic or pessimistic. I just see it as a normal set of discussions and negotiations so far.

Mr. Dixon: In the discussions I have had with Ontario Hydro on the concept, even though it is a relatively new concept for Hydro to have some private people coming and occupying part of its site and doing what it has traditionally done on the site, I have found quite a ready acceptance of that principle we are talking about and a willingness to accept the concept and then do studies around it to show us what it would mean to Hydro in terms of how it would need to operate and the like. Really, I have not seen evidence of a great deal of resistance.

Mr. Runciman: Are there any obstacles or hurdles out there that you are concerned about that could be brought to our attention?

Mr. Russell: In negotiating with Ontario Hydro?

Mr. Runciman: In respect to reaching a favourable conclusion.

Mr. Russell: Nothing that I would identify in particular. I was here yesterday for the session when some comments were made and there was a discussion about the price of electric power. The only comment I would make is that obviously the higher the price the more power there is available and the lower the price the less there is available. Somewhere in between there is a price presumably at which we hope to end up at an agreement.

Mr. Dixon: From a legal and regulatory point of view, we are not aware of any barriers for Ontario Hydro to accept our proposal and enter into a contract with us. They do similar things all the time with Hydro-Québec, Manitoba Hydro and other utilities and make power purchase agreements. There is nothing preventing Ontario Hydro from doing the deal with us now.

Mr. Runciman: I know you do not want to talk about prices obviously, but you have indicated that the Ocean State plant is going to be supplying the consumers, or the power pool in any event, at 5.7 cents a kilowatt-hour.

Mr. Russell: I calculate that as roughly the price today if the plant were running, yes. To compare that to the price of power calculated in a similar way here in Ontario, we have already discussed the power plant, and we anticipate some savings on the Hearn site, because of the facilities that already exist; but probably the biggest saving is the fact that the gas does not have to move that last several hundred miles from Ontario through to Rhode Island, which is a significant component of that 5.7 cents, it is not far away from a cent. It gives you an idea of the level of price that we see coming from it.

Mrs. Sullivan: I just had one final question. I think that this kind of turnkey and operating contract is not unusual in other industries and other technologies, but what happens to the plant at the end of the 20-year period? Does Hydro then assume ownership?

Mr. Russell: I think this would be something which we would be discussing with them. We expect to be here for more than 20 years so we would expect to be able to continue to operate it.

Mr. Chairman: They might be prepared to sell you an option.

Any further questions? Mr. Russell and Mr. Dixon, I would like to thank you on behalf of the committee for coming before us and explaining this project to us. I think it is quite interesting to see that use can be made of that site down on the harbour, so we wish you well with your endeavours.

Our next witness is David Glanville Williams. Perhaps we will just pause a second while they set up a few audio-visual aids here.

For the benefit of the committee, Mr. Williams was the consultant with Stone and Webster Canada Ltd. which prepared this report which was distributed earlier this week or last week on the question of coal combustion technology for the Minister of Energy.

Mr. Williams is going to be summarizing this report for us here today and perhaps also suggesting—I note this report was 1986—whether there have been any changes in the last two years

that might be of interest. With that, Mr. Williams, I turn the floor over to you.

STONE AND WEBSTER CANADA LTD.

Mr. Williams: This report, entitled Coal Combustion Technology Study, was prepared by Stone and Webster of Canada Ltd. under a contract with the Ministry of Energy in the period of July to October 1986. Since that time some other developments have taken place in this area of technology. I will refer to them to try to give you the latest picture.

My name is David Glanville Williams. I was the manager for the study, or the principal author of the report. My colleague, Geoffrey Noble who is an expert in environmental control and power generation systems, is the other author of the report. Mr. Noble has since transferred to Stone and Webster Engineering Ltd. in the United Kingdom and he is not able to be present today.

Before I go into the report, I would like to just make a few comments about coal in general that have some bearing on the philosophy of the way we think about the subject. Most people, if they happen to think about coal at all, regard it as a messy kind of black dirt dug out of the ground by a strange breed of men. It still has some uses as a fuel, but is regarded as rather old-fashioned. In recent years, it has been having a particularly bad press, being the culprit mostly blamed for our acid rain problems and, more recently still, for the greenhouse effect, whatever that phenomenon might eventually turn out to be. To many people, it seems the most regrettable aspect of coal is that we have not yet found ways of doing without it.

1510

The reality, however, is quite a bit different. The most striking aspect of coal is its sheer abundance. It is unquestionably our greatest resource of natural hydrocarbons. Coal resources recorded today on every continent are sufficient to last for hundreds of years. While other resources, natural gas and oil, are gradually depleted, coal will continue to grow in importance, both as a primary fuel and as a source of hydrocarbons.

Coal is also our most complex raw material. For well over 100 years, the dirt dug out of the ground has attracted generations of able scientists and engineers to study its production, its properties and the means by which it can be used safely and conveniently. This enormous scientific activity has not diminished. In fact, during the past 15 years it has increased, particularly in North America, as the realization has dawned upon us that coal, together with uranium, represent our most abundant and secure source of future primary energy supplies.

However, to speak of coal as a fuel in the singular is, in a technical sense, meaningless. There is a large variety of coals, having properties so different among themselves that utilization processes developed for one particular class of coal are unsuitable for other types of coal. For example, boilers designed to burn lignites, such as Ontario Hydro operate at Thunder Bay and Atikokan in western Ontario, are unsuited for firing of types of bituminous coals used at Lambton, Lakeview and Nanticoke.

Processes that have been developed to clean one type of coal, by removing as many ash-forming minerals and sometimes some sulphur as well, may be of no use whatsoever for treatment of coals that fall into a different classification. Certain types of coals have structures that soften and fuse when they are heated, and this enables them to be used in the production of metallurgical cokes which are used in blast furnaces and steel plants for smelting iron ores. However, a majority of coals are quite useless for metallurgical purposes. Their main purpose and use today is in thermal electric power generation. Other examples of these differences among coals can be quoted.

The point I wish to make is that the phrase "coal-fired power generation" implies technical and economic considerations that go beyond those encountered with the other fossil fuels, oil and natural gas. If we were interested only in the present our task this afternoon would be a bit simpler, but this study was really to look forward, beyond the end of the century, when the availability of new hydraulic sites will have been even further reduced from what it is today and when natural gas and oil resources will be that much further depleted. The continued abundance of coal and uranium and their security of supply will remain largely unaffected.

Certainly, in today's context coal is not a diminishing resource and neither is uranium. Fusion power remains a very distant goal and is beyond reliable prediction by anyone as to its future use. Cogeneration, the combined production of heat and power, is an efficient use of primary energy, but is constrained by the ultimate demand for the heat component. When its limit is reached, the production of additional electric power becomes less efficient and more

ostly than electricity generated at large generating installations.

Power generated from renewable energy ources is constrained by the total availability of hese resources. There is only so much usable unlight, there is only so much wind that can be sed and the supplies are inconstant. One could ven entertain doubts about future hydraulic eneration.

Climatic changes are causing much current oncern. What if they are really pointers to some ermanent changes? During the past two years ve have witnessed remarkable changes in our limate. We have had records being broken of all inds: hottest days, coldest days, most rain, ryest, longest droughts and so on.

To the extent that hydraulic power depends on ainfall, on the availability of rainfall, there are ome uncertainties with regard to the long-term uture availability of hydraulic power.

The future availability of coal and uranium is ot affected by these factors. It is in that context hat we perform our work with regard to coal. We ook at power derivation from all types of ources, hydraulic, natural gas, coal and everyhing else. Coal is just one of the sources we use nd we build and design plants that encompass all hose methods.

For now, my task is to summarize as well as can this very highly technical report that vas written essentially for experts in thermoynamics and power generation systems. Although it might appear complex, some of the uiding principles in it are explainable in easonably straightforward terms.

The report describes how substantial progress n core combustion technologies has been mainained, even as progress in other methods of lectric power generation has also grown signifiantly. But its purpose is not to draw comparions of this type. Ontario already has a large oal-fired generating capacity. At the moment, it mounts to about 10,000 megawatts, much of vhich is relatively new.

Given the lead times for large plants, design nd construction of the plant, the present plants re really based on designs that were current in he 1950s and 1960s while the construction was n the 1970s. The plants have been well-operated nd maintained so that the remaining plant life is xtended well into the next century.

The question is can that capacity now be nodified so that they can continue to burn coal nder conditions that will meet the most stringent lemands in terms of environmental protection and the reliability of supply into the new century with costs that are supportable.

The purpose of the study was to describe the technologies. It does not make recommendations. The principal conclusion of the study is that combustion technologies capable of burning coal for electric power generation, methods which are clean and capable of meeting the most stringent environmental control regulations, will be commercially available by the period 1995 to 2005.

The costs of the best of these technologies will compare favourably with the cost of fitting advanced flue gas cleanup systems to the existing coal-fired power plant in Ontario.

That is the conclusion. Our purpose is to show that particular end is justified by the means.

Here we deal with coal combustion technology. The items of principal interest are the coal rank and grade, the coal composition, its combustion characteristics, the solid and gaseous products of combustion.

1520

I will very briefly mention this area and points in regard to each of those.

Coal is a product of metamorphosis of vegetable matter. The change is produced by temperature and pressure, and on the length of geological time to which the beds of vegetable matter are subjected.

Coalification is therefore a process that proceeds in stages, from peat to lignites, and sub-bituminous coals to bituminous coals and anthracites.

The rank of a coal is a measure of the extent to which these changes have occurred. It has no direct relationship to the quality of the coal in the ordinary meaning of the term. It is just a particular type of coal structure.

The general changes which take place in the chemical compositions of vegetable matter during this progression, are summarized in table 2.1.

This is a description of the types of coals according to the degree to which coalification has proceeded. The essential thing is that the carbon concentration of the coal increases as we proceed from lignite to anthracite.

Compared to natural gas, coal is a hydrocarbon too, but whereas natural gas is 200 atoms of hydrogen per 100 atoms of carbon, lignite is the youngest of the coals, with only 18 carbons of hydrogen, and anthracite has only 15. So that is the difference. Coal, natural gas, oils–they are all hydrocarbons. The essential difference between them is the ratio of carbon to hydrogen.

Coal also has a lot of impurities in it–oxygen, nitrogen, and sulphur. Oxygen is of no great concern. It does not pollute; it just detracts from the heating value. Nitrogen and sulphur are of concern because they contribute to some of the environmental problems associated with coal.

The types of coal available in Ontario, accessible by established transportation systems, generally are shown here. In the Maritime provinces, we have bituminous, medium-volatile coals, They are classed as high-sulphur coals. In Saskatchewan, we have lignites, lignitic coals that are low in sulphur content.

Ontario Hydro, as far as we are aware, does not get coal from the Maritimes, but it does use Saskatchewan lignite. It also takes in coal from Alberta and British Columbia, and they range from lignitic to sub-bituminous. The whole range of coals are actually present in western Canada, and the particular coals that Ontario Hydro fetches from that area are the bituminous, high-and medium-volatile coals.

A characteristic of all the western Canadian coals is that they are low in sulphur. They are generally less than 1 per cent sulphur. In its classification, a coal that is less than 1 per cent sulphur is called a low-sulphur type. Medium-sulphur coal ranges from one per cent to three per cent. Above three per cent, they are regarded as high-sulphur coals and cause particular problems in electric power generation.

The bulk of Ontario Hydro's coals are known to come from the United States, and they come from Pennsylvania, West Virginia, Pittsburgh, Ohio, and Illinois, and they are bituminous, high-volatile coals. Generally, they are medium-sulphur categories.

At the time we did this study, Ontario Hydro was burning around about 12 million tons of coal a year, of which nine million tons come from the United States and three million tons came from western Canada.

Could we go to the next slide then? This is a typical bituminous coal burned by Ontario Hydro. You have the properties on this chart, table 2.0. Coal is reported in two ways. There is approximate analysis and there is an ultimate analysis, and then there is a set of other tests that define special characteristics. The basic content is an inert material that adds to the cost of transporting coal. It is generally not wanted and is generally taken out shortly before the coal is put into the furnace for burning. The ash is regarded as inert material and adds to transportation costs and, wherever coal has to be hauled a long distance, should be as low as possible.

The approximate analysis generally dete mines the economic attractiveness of a coal to th suppliers, and fuel purchasers look at th particular analysis in comparing and deciding th sources from which they get their coal.

Also, of course, the sulphur content important, but that is really part of the atomi analysis, which is the ultimate. This is th analysis that is used by designers of boilers determining types of boiler designs that a appropriate for different types of coal. I me tioned earlier that a boiler designed for lignite not much good for burning bituminous coal.

The grade of a coal is alterable. As it comes o of the ground, it is contaminated with clay. might be pretty wet. It has some extraneous roc in it. It is possible to wash out and separate th substantial part of that, reducing the ash conte to acceptable limits. Sometimes those process also take out a fair amount of sulphur. That something I will refer to a little later, but it is n the general case. We cannot guarantee that w can always take sulphur out of a coal by washin it.

I would like to talk a little about all th problems where the gaseous emissions aris Sulphur occurs in coal in three modifications. is there in organic combination; it is part of th coal molecule; it also there as some pyriti sulphur. That pyritic sulphur is the problem. Iro pyrite is the fool's gold that people are famili with, and that tends to be distributed througho the structure. It is in the coal and it is also in th mineral matter that is associated with the coal Also, in some coals there is some sulphat sulphur as well, another form of inorgani sulphur.

Generally speaking, all the sulphur in a coa goes up the stack. It goes into the flue gas whe the coal is burned, so the total sulphur of a coal a direct measure of the amount of sulphur dioxid it is going to produce and a measure of th pollution that will arise from that source.

Another difficulty in burning coal is that produces what are called nitrogen oxides. W call them NO_x. They have their origins in tw sources. In the first case, if the fuel has nitroge in it, some of that nitrogen will end up as nitroge oxide in the flue gas but not necessarily all of it There is another peculiarity here. Some fuels d not have any nitrogen at all in them. Natura gases, for example, also produce NO_x when yo burn them and can be quite prolific producers o NO_x. That NO_x is contributed by the combustio air. It comes from the air fixation and th nitrogen in the air.

These were some tests that were done in alifornia by the Electric Power Research stitute. It shows that you can take distillate oils ıd burn them, and the most significant connecon between the fuel and the amount of NO_x that produced is the flame temperature. That is why ere is a family of straight lines there. But if you amine the diagram a little more closely, you ill find that the fuels that have the lower trogen content also tend to produce less total O_x than the other fuels.

530

I would like now to pass to section 3 of the port and talk about the pollution control ethods. We talked about sulphur dioxide and trogen oxide and how they are formed at ectric generating plants. The other material that formed is solid waste, fly ash and bottom ash om the furnaces.

As far as the collection of the particulates are ncerned–keeping the dust out of the air–there e reasonably efficient methods for doing that. he big problem is that the industry's application the last 15 or 20 years with regard to gaseous nissions has been the control of sulphur dioxide ıd nitrogen oxides.

Efficient means of removing the particulates e available. They are already in use and they e still being improved upon. I do not think that is aspect of the pollution problem requires uch further discussion at the present time.

The current environmental control guidelines not require the total elimination of sulphur oxide or nitrogen oxide from stack gases, but ey do require reduction in their concentrations. ontrol strategies can therefore be broadly assified into two groups. First, methods that ive been effective in producing partial reducon of sulphur dioxide or nitrogen oxide; second, ethods that can be used to achieve virtually mplete removal.

These methods can be classified into three neral categories. The first is coal selection by vitching to low-sulphur coals and by coal ending. The second is treating the coal to move the pollutants before it is burned. This is nerally referred to as precombustion treating of e coal.

Another method is converting high sulphur als to other fuel forms with simultaneous moval of the sulphur and of the nitrogen itself. hat implies converting the coal to fuel gas or nverting it to a clean coal liquid and then firing ose products as the fuel instead of putting coal . We will come back to those aspects later.

If those methods are not applied or are not applicable, then the removal of sulphur dioxide and nitrogen oxide at source during combustion can be pursued. That is actual removal of them from the products of combustion within the furnace of the boiler itself. If that is not practised, then the final solution has to be by removal of sulphur dioxide and nitrogen oxide from the flue gases. That particular method is described as post-combustion cleaning or flue gas desulphurization.

All these methods represent various degrees of effectiveness as well as complexity and cost. They may be subject to constraints in particular situations. There seems to be a simple matter of fuel switching where utilities will switch their coal supplies in order to purchase more low-sulphur coal. This can cause technical problems and contractual problems. There might be other economic factors as well that constrain the introduction of that method.

In fact, Ontario Hydro has been doing this for some years and has achieved quite a remarkable reduction in the average sulphur content of the coal it now applies to its power plants. It has been reduced from something like an average sulphur content of 2.4 per cent and is down to about 1.4 or 1.5 per cent at the present time essentially by fuel switching methods.

Coal blending is a question of mixing low-sulphur coals in with higher-sulphur coals. A low-sulphur coal is available to Ontario Hydro. It comes from western Canada. They have combustion characteristics that are not similar to those obtained from the United States, so there are some technical constraints. This problem has been talked about for a long time in Canada by the federal Department of Energy, Mines and Resources and by Ontario Hydro and other people. Why it causes difficulties and why it has to be studied and understood is shown by this figure 2.3.

We see that the combustion profiles or the rate at which coal is burned is very critically dependent upon the particular rank of the coal. Lignites burn very fast, anthracites burn slowly and bituminous coals are in between. The question of trying to blend lignites with bituminous coals would alter the burning profile of the mixture. That can only be done if the particular boiler design is such that it has the flexibility to accommodate that change in combustion characteristics. That is coal selection and coal blending.

The next one, which I mentioned earlier, was precombustion cleaning. Coal washing to remove the ash also removes some of the pyrites,

some of the sulphur, but until recently the deliberate design of commercial plants to achieve substantial desulphurization of coal by removing pyritic sulphur has been rare. Greater interest has been shown since 1970 and the subject has been intensively studied in some countries.

A new plant for so-called deep cleaning has been built, which includes additional circuits specially designed to remove pyrites from coal. Pyrites can be liberated by crushing the coal to increasingly smaller sizes before cleaning it, but the cost of washing coals increases quite dramatically as the particle size of the coal decreases. Work carried out in West Germany has generally shown that for coals used in thermal power generation, crushing the coal below three millimetres in size–that is one eighth of an inch–is generally not economic and that effectively represents the limitation on precombustion cleaning.

Where the coals are amenable to being cleaned by washing and removal of pyritic sulphur, the physical method is effective in removing between 15 and 50 per cent of the total ash content of the coal; so it is an improvement that cannot be ignored, but is not a total solution to sulphur dioxide problems.

The report goes into great detail here on this question of precombustion cleaning, including the cost comparisons.

I would like now to turn from the question of cleaning the coal and the sulphur problem to the formation of NO_x, nitrogen oxide, which is partly from nitrogen in the coal but mostly from nitrogen in the air. Modification of the combustion process to control nitrogen oxide formation is the most common and cost-effective means of reducing NO_x from coal-fired utility boilers. Although much of the NO_x control technology currently in use would be valid for new units, the greater focus today is on development of hardware for retrofit applications.

Several combustion modification techniques for NO_x control have been considered. The most viable, cost-effective options involve modifications to the burner design or the method of firing. Principally, these are the control of low excess air, of maintaining low excess air; that is, beyond the amount of air that is required theoretically for completing the combustion, any excess air should be kept to very low limits.

1540

The other thing is to add air above the immediate combustion zones; and another is special design of NO_x burners themselves. On this basis, Ontario Hydro has itself been very active, particularly at Nanticoke. At Nanticoke they have already modified some of the boilers i this particular regard and have been successful i reducing NO_x emissions. We are still in th process of discussing the formation of NO_x an of sulphur, but particularly of NO_x during th combustion process itself.

Another method, which represents a ne technology that has come in within the last fiv years, is the introduction of what are calle advance slagging combustors. These are devel opments that have come out of the original use c what were called cycling combustors, whic were introduced in the 1940s for burning coal that had low ash fusion characteristics an generally were not too useful for pulverize coal-firing because of rapid fouling of th furnace and of the convection passes, the hea exchange surfaces.

In the 1950s and 1960s, particularly in th United States and Germany, these cyclin combustors, which are very high intensit combustors, were widely introduced into electri power generation, but by the early 1970s, whe environmental concern started growing, it wa found that they were also prolific generators o nitrogen oxides, and the result has been that b about 1976 virtually every plant that had cyclin firing had been decommissioned, and whereve there was coal-firing it had been converted agai to pulverized coal type of firing.

Since the mid-1970s, people like TRW Rockwell International and some other develop ers have designed cycling type but advance slagging combustors that are two-stage proces sors. These are now being commercially demon strated, certainly on industrial boiler plants, an are becoming available for future application t large-scale electric power generation. What the do is, in the first stage, they burn the coal a intensely as possible but with no excess air, s there is very little nitrogen oxide production That section acts as a gasifier. It also takes ou most of the slag, and then the flue gas that exit from that into the main furnace itself is substan tially free of NO_x and substantially free of as and particulates.

A particular method of modifying the combus tion inside the furnace is to inject or add into i solvents that will react with the sulphur dioxid and help to reduce the NO_x formation. One of th ways of doing this is to inject alkaline materials the cheapest of which is limestone, but lime i very effective as well. Other materials ar generally too expensive to be considered for thi purpose.

Ontario Hydro has been very active, actually. has had the largest demonstration program for olvent injection at the Lakeview generating ation. During the course of the study, we isited that and we observed this operation. It is apable of removing about 40 per cent to 50 per ent of the sulphur, which then goes out with the y ash from the furnace. It is a useful way of ducing sulphur dioxide but not of achieving omplete elimination of sulphur dioxide.

Another method is called fluidized bed comustion. In fluidized bed combustion, the coal is urned actually in dilute phase. The material is ssentially a bed of ash and available materials ke limestone or lime that will absorb sulphur oxide as it is being produced. The amount of el actually in the bed is usually very low, only vo per cent to five per cent. If it is above that, e thing becomes a gaseous fire, and the tention is to achieve total combustion within e bed itself.

Figure 2.5 is a schematic of a pressurized uidized bed combustor. These combustors can operated at atmospheric pressure, or coming ong they are capable of being operated under essure as well. If the atmosphere is 10 bar, 15 ır or 20 bar–actually there is no real limit to the essure at which they can be operated, up to ry high pressures. It is a question of the cost of anufacturing the furnace unit.

What happens is that coal is fed into the bed d mixes. The fluidized bed is a boiling bed of lids. It burns within that bed, and as the sulphur oxide is being produced, it is already being mediately absorbed by the limestone or the her calcareous materials in the bed.

It is an extremely efficient form of combustion low temperatures. The temperatures rarely ive to exceed 800 degrees Celsius before the al becomes completely burned out. It is erefore a very intense method of burning coal at mparatively low temperature. Because of the w temperature, the NO_x formation is limited. It fectively achieves both virtually total removal sulphur and a very substantial reduction in O_x emissions at the same time.

There is a great deal of interest in pressurized uidized bed boilers today. They are being idely used in industry now. The commercial monstrations of them are now up to about 180 egawatts, so they are not large-scale power ants yet, but within the next 10 years it is pected that they will have been developed to e 500-megawatt, perhaps even the 700-egawatt, scale.

The pressurized system has another advantage. By operating it under pressure, it is possible to take the exhaust gases and expand them through a gas turbine and generate power at that stage, as well as generate steam in the bed in commercial and heat exchange services in the ordinary way. When that is done, the overall efficiency of power generation is increased to 40 per cent or 45 per cent from a customary 37 per cent or 38 per cent in a very efficient pressurized fuel furnace. It allows the possibility of combined cycles.

1550

The next methods that I mention are conversion of the coal to some different sort of fuel in cleaner form. The two possibilities there are gasification to gasify the coal or gasification to liquefy the coal.

The first of these, the gasification of coal, has now achieved intense interest. It was first carried out by the West Germans at their Lunen plant in the 1970s. The general possibilities of this method were demonstrated. There were some problems in the plant with the reliability of the plant and so on, but gradually over a period of years these were overcome. The thing looked more reliable, looked a better bet and there was great interest in it.

In the United States, there is now a plant operating at Daggett in California. It is called an integrated coal gasification/combined-cycle power plant. First, the coal is converted to gas, so it requires a gasification system. There are three general types of gasification systems, each of which is illustrated on this figure 2.7.

In one of the gasifiers, coal is held in a fixed bed, oxygen and steam are passed into the bed of coal and the gas or the fines pass out of the top of the gasifier into a gas purification system. That system has to take out some tar. It also has to take out dust. It also has to take out some ammonia in some of the processes and water condenses out. What is left is a clean fuel gas of 250 to 300 BTUs per cubic foot quality. That is then a very clean fuel for passing through a gas turbine–a combustion turbine–the exhaust from the combustion turbine being used to generate steam to create a combined cycle.

Another type of gasifier is a fluidized bed. This is similar to the fluidized bed that we just talked about for combustion, but the purpose of this one is to convert the coal to gas, rather than burn it within the gasifier itself. That is done by retaining a high concentration of fuel in the fluidized bed.

Finally, the third type of gasifier that has been developed is called the entrained bed type of gasifier. This is a very rapid reaction gasifier in which the coal and the oxygen and the steam are blown in and virtually pass through the gasifier. The action is very rapid, and what comes out of it is fuel gas and the particulates.

These processes in which coal is gasified and then used for combined-cycle generation are of very great interest, as I said, and we expect a lot of application for them in the future. Already some of the major American utilities have expressed interest in them. Virginia Electric and Power, Wisconsin Electric Power and some of the other ones have already declared their interest and intention to construct demonstration plants in the near future.

That description of coal gasification is the first of the options of converting coal to some other fuel form, and they are overcoming the environmental problem. The other one is coal liquefaction. There are two broad ways in which coal can be converted to liquids. One is merely to add hydrogen to the coal. Take the coal, put it under pressure, heat it, add hydrogen to it and the thing turns into oil. That sounds very simple; that is essentially what it is.

The technicalities are quite severe in some cases, but this table 2.10 lists some of the processes that have been under active development in recent years, mostly in the United States but also in some other countries. They all show promise to various degrees of being able to produce a sulphur-free oil from coals.

One of the most recent of the processes to be developed is the bottom one, developed by the Ontario Ohio Synthetic Fuels Corp., and it has combined the H-coal and H-oil processes into a single process. There are plans to build a plant in Ohio which will be supplied with natural gas as the source of hydrogen and coal from Ohio as the coal source, and the oil will be burned at an oil-fired generating plant in that region. The Department of Energy in the United States has put up a substantial amount of money and some other people have been involved in this development. That is going on at the present time.

Whether this kind of development will come off will depend very largely on the future world prices of oil. At the present time it is very difficult to make an economic case for it, but in the future, if oil prices do rise again, as some people think they will, then because the cost of coal is not subject to the same price pressures, this type of development might become useful. It is included in this study because Ontario Hydro has an oil-fired power plant, the Lennox plai and when we consider the options that Ontar Hydro should consider, this question of using coal-based fuel oil for it arises.

So much for conversion to other fuel forms would like now to talk about flue gas desulphu zation, which is one of the more immedia options that Ontario Hydro and other utiliti have to face. Canada has not yet installed scrubber at any power plant. It has not been do here in Ontario and it has not been done in t Maritimes. At the present time there are som thing over 200 scrubbers that have been co structed and are operating in the United State There has been intense development of them Germany, Sweden, Finland, Japan; some cou tries have been very active.

The experience we have of these systems at t present time is imported experience. It is n based on anything that has happened yet Canada. It raises some problems because, if can be technically done in Japan or technical done in the United States, we can certain technically do it in Canada. The costs and t comparative economics of these processes mig be very different in those countries and do n provide us with much of a pointer as to ho attractive or how economic they are likely to l here.

1600

I will come to the next slide. These are very b tables. These are tables 3.7 in the report and th are a summary of flue gas desulphurizatic processes for which we were able to obta information. It is probable that there are over 1(processes under development at the present tim Many of these processes are only variations on theme and there is very little informatic published about them. The people who are doin the work are not publishing their results, but tab 3.7, which covers two pages, sets out th principal ones. This is the first page.

The primary agents have to be cheap or, if the are not cheap, they have to be regenerable. Th most attractive reagent was this limestone, whic is available in most countries, most regions an most districts, virtually everywhere, and can b mined and prepared reasonably cheaply.

Each of these processes has been taken beyon the demonstration side. The ones that have a under "Development Status" have already bee applied at some utility somewhere. Some of the have proven pretty successful.

The wet limestone process, the dual alka process and the Chiyoda process, a Japanes process, are working very successfully indeec

ne of the biggest problems in this is that these et processes involve an addition of a chemical ocessing plant to a power plant and one of the g factors that management in a power plant has face is the reliability of its electricity neration. It really cannot do much that would duce the reliability of a generating system.

In the early days, these plants caused a lot of oblems. There were many outages and because that they were not regarded very kindly by erators of power stations. They have been bject to improvement as time passes by and as erating experience has been gained.

The wet processes that were shown on the evious page and the top of this page produce udges and the sludges themselves produce oblems in environmental disposal. That is one the principal defects. Generally, though, they e efficient in removing sulphur dioxide. They move virtually 90 to 95 per cent, perhaps even gher than that, of the sulphur dioxide found in e flue gas.

An alternative to overcoming the wet sludge oblem is spraying alkalized lime, or limestone at is not very wet, and then allowing the heat in e flue gas to evaporate them at the same time e sulphur dioxide is being taken out. Some of ose processes have been made to work asonably well.

On the next page, as you see, the top line there the lime spray drying process, semi-wet. It moves 60 to 90 per cent of the sulphur. If soda h is used as well, it becomes even more ficient; it will remove 90 per cent. That sort of ocess reduces the environmental disposal oblem of wet sludge.

Finally, there are processes that inject reagents er the boiler and before the electrostatic ecipitators that react to sulphur dioxide at the wer temperatures that exist in those areas. The lids that are rejected are picked up by the ctrostatic precipitator system and taken out as ash.

Some of these processes are becoming quite fective too. What I am trying to say is that there a lot of processes that can be examined for a rticular power plant in a particular situation at are known to be effective if they are designed d operated well.

Ontario Hydro, in its plans for the future on s environmental assessment, has mentioned ır processes that it intends to investigate ther. They include the wet limestone slagging ocess, the dual alkali process and the lime ray-dry process, in addition to the work that is being done at Lakeview, where solvent is directly injected into the furnace zone itself.

I would like to finish as quickly as I can by passing on to just mention developments in electric generating systems that will help to reduce the pollution from coal-fired systems, coal-fired generating plants, because they are more efficient. Because they are more efficient, they will require that less coal is burned for a given amount of electrical energy. Arising out of that fact alone, there would be a reduction in the environmental problem.

Some of these relate to the power generating cycles themselves, the conversion of heat to electric power. They come out of improvements in materials of construction that are taking place all the time and are being intensely pursued in some areas. They will allow boilers to be operated at much-higher pressures than they are now. Boiler pressures can go up to 4,000 pounds per square inch compared with 2,400 pounds per square inch now. Operating temperatures would be higher too. That is being done. Money is being spent on it and contracts are being awarded. The boiler manufacture is going ahead.

Another area is in the turbines themselves. The steam turbines will have to operate at these higher pressures and these higher temperatures, and work is going on in that area. Also, we have magneto hydrodynamic generation, which is the result of quite remarkable co-operation between the Americans and the Russians, which has been going on for some time, in which combustors of the advanced slagging type have been developed.

Michael Faraday showed that when a conductor moves in a magnetic field, it generates electricity. In this case, the movement conductor is the flame from burning coal; that is the conductor. That moves at high velocity to a magnetic field. Electrodes are put inside that flame and they are able to extract large amounts of direct current. There are means for converting that direct current to alternating current, and also the energy that passes from that generator goes to conventional steam generation and power generation as well.

It is a totally combined system that promises to be extremely efficient. It waits principally for developments in materials of construction, but that work is going ahead. It is unlikely to be available by 1995, but perhaps by the end of the century demonstration on a commercial scale will have been in progress.

Other things are happening as well. In France, Electricité de France is building a plant at Genevilliers which uses steam as a main cycle

and uses ammonia as a bottoming cycle to extract further power from the process. We are waiting to see how that is going to turn out. There are substantial hopes that that will be available, certainly by the end of the century.

In California, there is a very interesting process in which the steam and the ammonia are mixed together. It is called the Kalina cycle. There is a demonstration plant under design and construction now. My company, in fact, has been involved in this project. That promises to increase the efficiency of power generation quite substantially, if it comes out. Again, there are reasonable hopes that that will be available by the end of the century.

A lot of the processes I have told you about can be applied to existing power generating systems, to utility plants. They can be used to retrofit or to repower an existing power plant. Some of them are not so easily applied for that purpose. The flue gas desulphurization scheme to add on things like integrated coal gasification, combined cycle, really requires the design of a new plant.

1610

In the overall study the typical options that we saw available for Ontario Hydro by 1995 and beyond would be coal selection and blending, modification to existing boilers, addition of flue gas desulphurization to existing boilers, replacing existing boilers by atmospheric fluidized bed or by pressurized fluidized bed. Existing boilers could be replaced by combined-cycle coal gasification plant. This would include depowering with gas-fired turbines integrated with existing steam turbogenerators.

In the case of the Lennox plant, it could be possible to substitute fuel oil with low-ash coal-water mixtures, slurries. This is interesting because a coal slurry plant has been built by the crown corporation in Sydney, by the Cape Breton Power Corporation. They started producing cold water slurries, which can replace oil in certain applications. There is an industrial boiler in the Minas Basin, the pulp and paper mill, that is burning this material now. That would be one option for Lennox in the future.

It is possible to replace the burners with staged combustors of the advanced slagging type. Minimum derating of the unit would be necessary if that were done. That would require, for example, that the Lennox station has facilities on which a coal-handling plant could be put; that there is space around the station so that the coal-storage yards and the coal-handling equipment could be provided. It is possible to substitute petroleum oils with low-ash, l sulphur coal liquids. Again, that would req the addition of coal-storage handling faciliti the Lennox plant.

The first six of these options I am sure h been looked at by Ontario Hydro at some stag other. At the present time, it appears to me the fuel gas desulphurization option is the that is going to be pursued more intensely t the others.

On the question of costs, there have b studies made by the United States Departmen Energy and by electric power researchers on h these options match up against each other. W we found when we considered them in relatio the Ontario situation is that there is no Canad experience. Looking at the American exp ence, translating it into Ontario terms, we fo that we were not able to be precise at this st At every power plant, every unit in the po plant had site-specific practice related to it would determine or have some influence deciding the technical options.

It would also affect the capital cost require make the change, the cost required to operat things like whether you get a bit of wet sluc whether there are facilities to get rid of sludge, the transportation of wet sludge and al these things that have become local site-speci so that being precise about costs is not possibl will only become possible when a decisio made: "Yes, this is the way to go. Let's loo the situation and come up with a set of costs, engineering design and all the other things."

We have ranges and the ranges overlap, ranking the options is quite difficult. Still, table presents the situation as we think it appl Also, in relation to Hydro, we think that wh there are ranges quoted the costs would towards the lower part of the range rather than upper part of the range.

As I said, the report drew no conclusions. were not required to draw conclusions other t to make recommendations. It was purely describe the situation as we saw it. It has b long and complicated. Thank you for listenir

Mrs. Sullivan: This is very complicated s for most of us. I suppose that in the long run, development of these technologies will almos as long term as looking at fusion options something. Until there is a vibrant interest, example from the private sector, in becom involved in development, do you foresee other areas where there is going to be moveme

Mr. Williams: To some extent, yes. It i question of scale as well. Cogeneration scher

ıre one aspect of the private sector becoming nvolved in electric power generation. That has eally taken off in the United States, as you :now.

Cogeneration plants there are either coming nto operation or being designed or being onstructed at the present time. Most of that has een funded by the private sector. It is possible ıere because American law allows the electrici- y purchase price to be calculated according to ıe avoided cost of the utilities.

In Canada the attitude of the utilities is quite ifferent. Some utilities are not prepared to onsider cogeneration; British Columbia Hydro, or example, is not very willing to look at any ogeneration schemes. Most of the others are repared to consider it on their terms, but they are ot as favourable as they are to cogenerators in ıe United States.

Ontario Hydro has said that it would consider ogeneration schemes. It is, in fact, very ıterested in talking to the private sector, we nderstand, for the north and the northwestern arts of the province. Some people such as the ipeline companies could build cogeneration lants in that area. The pulp and paper companies ould, and so could the mining companies.

Yes, the answer to your question is that there ill be some interest by the private sector. To hat extent it will make a really major contribu- on to future electric supplies, I do not know. It difficult to say at this time.

Mrs. Sullivan: One of the things you men- oned was the problem of ash and sludge moval. The committee visited the research cilities at Hydro. Clearly those problems are ot yet solved. Do you see any prospect for teresting use or interesting new technological velopments in terms of ash and sludge?

Mr. Williams: For the ash, yes; flyash from ocesses using many types of coal is pozzolanic, hich means it has water-setting, hydraulic- tting properties. That it is already happening ow. People use it for making concrete blocks ıd putting it into cement bricks.

Regarding sludge, are you talking about the yash itself–ordinary flyash–or are you talking out what might come out of these future flue ıs desulphurization plants?

Mrs. Sullivan: Yes.

520

Mr. Williams: Again, it depends very much ı local circumstances. One of the earliest sulphurization plants was in Virginia. They ok the sludge from that plant and they laid it down over about 10 acres at an airport in that area and it proved quite useful as an apron, that particular sludge did. There have been other small developments where the stuff is used. Most people make it into construction materials.

I would say that any interest by the private sector has already been expressed. People who think they can use these materials are already aware of them and have come forward in some cases. I do not think it is a real major answer or solution.

Mr. McGuigan: Along the same lines, does the residue from the desulphurization have any use as an agricultural additive to the soil? I think the key is, does it have any further neutralizing agent in the calcium? Calcium or limestone is used to neutralize soils, and sulphur in itself is a neutrative element for plants. That is how it got in coal in the first place. Is there any further neutralizing effect left in that limestone after it goes through this process?

Mr. Williams: Further utilization?

Mr. McGuigan: Yes.

Mr. Williams: Some of the processes actually produce the sulphur as sulphur, which in turn can produce sulphuric acid which can be sold. There are these methods well ahead, but they are not among the more immediate ones. We think they will still be under development by 1995, but they would have been demonstrated, so the idea is that they would be available in time to meet the Ontario Hydro programs vis-à-vis sulphur dioxide emissions after 1994. They are certainly coming along, yes.

Mr. McGuigan: My specific question was, after the limestone has gone through the process of neutralizing sulphur in flue gases, is there any further neutralizing element left in that limestone or is it all spent?

Mr. Williams: No, it is not all spent. The process is trying to make the most efficient use of the calcium. With the fluidized bed combustion process, you can get 99 per cent removal of the sulphur dioxide where the ratio of calcium to sulphur atoms is less than three. It can be as low as 1.8. It depends to some extent on where the limestone comes from because the reactivity of the stuff is different, in different parts of the country. But that can be determined before the plant is designed and so forth.

Yes, dolomitic limestones are generally more efficient than all slate limestones for sulphur absorption. There is a large amount of research and development in this area. People are very aware of that. It is important because it reduces

the total amount of ash that we have to dispose of. On the flue-gas desulphurization side, lime is more efficient than limestone, but it costs more.

So again, it is a question of striking a balance, whether you use limestone in your wet scrubber or whether you use lime in your wet scrubber, or whether in fact you go for things like sodium which are stronger alkalines and more effective when they are taking the sulphur dioxide out, but you can only justify use of sodium if you recover the sodium again. So some of the processes start off with sodium and then they use calcium to recover it, and then they throw away the calcium sulphate and the sodium goes back into the process again. They were listed in that table.

There is still potential there for improvement, development, better costs in the future.

Mr. Chairman: Mr. Williams, I guess our time is up now. On behalf of the committee, thank you for coming in and taking us through this report.

Mr. Williams: Pardon? I am sorry?

Mr. Chairman: I was just saying I would like to thank you for coming in and taking us through the report and helping to give us some understanding, with your submission, of the various technologies available to clean coal. Thank you very much.

Mr. Williams: Thank you very much.

Mr. Chairman: Our next witnesses are from the Municipal Electric Association, so perhaps they could come forward.

Mr. Anderson, I will turn the floor over to you. Perhaps, though, for Hansard, you could formally introduce your panel.

MUNICIPAL ELECTRIC ASSOCIATION

Mr. Anderson: Thank you for the opportunity of being here today. I am Carl Anderson and I am chairman of North York Hydro and also chairman of the Municipal Electric Association. With me today are three staff officers of the Municipal Electric Association, Arthur Bowker, Charlie Macaluso and Maurice Tucci, who work for us.

I understand that you have received a written piece from us and I assume that everybody has read it. I understand that each MPP has received one of these at some time in the past. It explains what the Municipal Electric Association is. If any of you want another copy, we would be happy to give it to you. I have an oral presentation to add to our written one, if I may.

The first part has to do with just a bit, again, of who we are. For more than 75 years, the MEA has been the official spokesman on policy for the municipal electric utilities within Ontario. Ove 300 utilities provide electric service to over 2. million electric customers. These range fro households to large industries. The membershi of this association represents about 70 per cent c the customers and 70 per cent of the electricit consumed in this province. In representing th 300 utilities, we have over 300 mayors and large number, over 700, elected and appointe people who represent the customers.

Each municipal utility is made up of publicl elected or appointed commissioners and thei staff, plus the mayor. They serve and represer their customers and are sensitive to customer needs and wants, because they deal with th individual customers on a day-to-day basis.

In the light of this sensitivity to customers an as spokesman on behalf of the association' member utilities and their customers, I am her today to convey our concerns regarding the dra demand/supply planning strategy and its potential effect on the relationship we have with ou customers. But first, I offer just a little background as to the historical setup of how we cam about and where we are coming from.

As early as 1902, municipalities fought to se up public power systems that could benefit th people of Ontario. Municipal representative argued: one, that the publicly owned utilitie should generate electricity; and two, that municipalities should distribute it. They felt strongl that there should be local control over the retai service of electricity, and they believed that ther was need to centralize the control of generatio so that electric power could be supplied widel across the province.

When the Hydro-Electric Power Commissio of Ontario was created in 1906, the overridin concern of those founding fathers was th concept of power at cost. To achieve this, the had fought for legislation which encouraged th formation of local electric utility commission responsive to local community needs.

In 1907, the Power Commission Act wa passed to set up a power system partnership i which the provincial commission, which is nov Ontario Hydro, acted as the wholesaler and th municipalities as retailers of electric power Hydro's central role was that of a truste managing the generation system for the benefit o its owner-customers, the municipal electri utilities. Its chief function to this day is to suppl all those municipal electric utilities with power a cost.

1630

In 1912, our association was founded to rovide a democratic forum in which the unicipal electric utility commissioners could oice the concerns of their customers. It is rough this association, the Municipal Electric ssociation, that many of these concerns con- nue to be expressed.

Local utilities, as you know, are publicly wned and are accountable to their investors. hese investors are you and I and the people who se the electricity in this province. Their mandate to provide a low-cost, reliable supply of ergy. The emphasis has always been on rvice, not products.

Providing this service reliably in the future has ecome a growing concern to our utility mem- ers. In the past, predictable growth has always llowed us to match demand with supply fairly ffectively, even though we had some bumps and umps in the past and the planning required took ver 10 years.

However, predicting how in the future elec- icity demand requirements will grow has ecome very difficult because of the unpredict- bility of economic growth. With the advent, if it omes about, of free trade, what effect will that ave? I do not know and I do not think anybody se does either. There are lots of guesses.

This uncertainty over future demand growth akes planning very difficult. Hydro has fore- ast a growth rate of demand of 2.4 per cent per ear until 2005, with the 60 per cent probability at the demand rate will actually be between ero per cent and 4.3 per cent. By 2005 the fference between these projections would be rger than the present system. That is mind- oggling if you look at those numbers.

Ontario requires a strategy which will cope ith the considerable range of uncertainty. I ust emphasize to you that if Hydro is able to eet the full range of possible demands econom- ally, it is clear that decisions are going to have be made and made very soon. The ideal anning strategy would be one with enough exibility that it could closely match demand ith supply. But realistically, there are limits to hat can be done economically. There is no plan hich will be optimal for every growth scenario.

Consequently, we really require a strategy hich plans for what we believe is the expected recast, but in addition includes contingency ans which will allow some flexibility to spond to higher or lower growth. Hopefully, is desired flexibility could be obtained through combination of options which could be advanced or delayed without significant cost penalties.

One of the key elements of the DSPS is incorporation of demand management options in the planning process. As you no doubt know, demand management options are defined as actions to influence the amount or timing of electricity used by customers. This would include, according to the way we see it, (1) load shifting, (2) electrical efficiency and (3) time-of-use rates.

One of the most significant attributes of demand management as we see it is that most of the contribution to the electrical system can be adjusted as needed. Demand management has the fastest response time to system needs. We saw a bit of that this summer when we had a number of problems in the province and you had some management of the system that allowed us to get over that one-day hump that we required in the province.

However, it is apparent that to obtain a large contribution to the electric system, the time required to fully implement demand management is approximately the same as needed to plan and construct a large generating station. Programs and systems must be developed and be well in place before they are needed if they are going to be used to meet demand requirements.

Of necessity, except for Hydro's large users, demand management will largely be implemented by municipal utilities. They will be heavily involved with Hydro in reviewing and approving the demand options and in negotiating the implementation with their customers.

In determining the appropriateness of specific demand management programs, we believe it would be required that expenditures on each program result in a net benefit to the system. In addition, the cost of these programs should be considered part of the normal operating cost of the supply authorities and should be recovered through the rates. To avoid inequitable cross-subsidizations, it is important that a sufficient number and variety of demand management programs be developed to ensure that all customers have the opportunity to participate and share in the benefits.

The association supports Hydro becoming involved in offering cost-justifiable capital incentives to encourage efficiency or load shifting, but the MEA would not support rate incentives which would conflict with the power-at-cost concept unless everyone could benefit equally. Demand options should not be mandated, because customers often have differing priorities.

While some programs may be readily acceptable in some districts, the same program in other regions may face serious resistance. If you get serious resistance, you do not get a demand program.

The local utility should not be forced to impose programs which do not serve local needs. We feel there is some uncertainty about how demand management will contribute to the total system requirements. Demand management contributions may be unreliable. We have some experience in this. Once individual customers implement conservation measures, lower electricity bills often bring about less concern about controlling use and consumption may rise, thereby making some demand management programs unreliable and unpredictable.

Demand options can be implemented very quickly if preparatory work has been done. United States experience shows that research and demonstrations, market development and program design take years. Once full-scale implementation starts, it may take 10 years to fully penetrate the market. The MEA has consistently pushed for Hydro to accelerate its efforts in developing demand management programs.

Until recently, uncertainty about future changes to the wholesale rate structure had prevented utilities from committing to significant demand options. With the implementation of the new time-of-use rate structure, the utilities are now in a position to begin to decide how they can proceed. It is expected that the time-of-use wholesale rate structure will greatly improve the likely success of demand management and the further activities by the municipal utilities.

In spite of our support for demand management incentives, we believe it would be a serious mistake to neglect the possible need for significant new supply options at this time, given the long lead times required. Demand management should be relied upon to meet only part of our demand requirement.

The uncertainty of the demand options and higher-than-expected growth of the past few years has led many MEA members to believe that supply options are being neglected. At this time, it appears it may be difficult to economically satisfy the high load growth projections. I say "economically." There are all kinds of ways of satisfying those, but on an economic basis that is something else. Hydro's planning strategy gives priority to economic renewable generation and independent generation. After implementing programs of conservation, cogeneration and nonutility generation, major generation facilities are going to have to be built to meet the deman requirements under the expected growth forecast.

The estimates of additional base-load suppl requirements, even under the likely foreca growth scenario, have a wide range because c the uncertainties with respect to the effectivenes of the demand management program, the amour of supply from the independent producers and th economies extending the lives of existing genera tion stations beyond 2010. Excluding the likel demand management contribution, the annua load growth to be met by new supply options i predicted to be 600 megawatts per year, and tha is in addition to whatever happens in demand an everything else. We are still going to need 600.

In the far future–maybe sooner, but we see in the far future–solar power, hydrogen an pumped storage may be economical in Ontaric But at this time we have three major suppl options from which to choose: fossil fuel, nuclea and purchases. Which large-scale option i chosen as the next major source of ne generation will depend largely on which criteri are emphasized. Significant new hydraulic ca pacity cannot be expected, because feasible ne sites for hydraulic power in Ontario are limited Some of the northern parts of this province ma well be fed from new hydraulic–because the have the rivers and the systems, it may b possible–but in southern Ontario, where the bi power demands are, with the exception o another building at Niagara, we do not hav much left.

1640

Independent generation is expected to contrib ute anywhere from 300 to 1,000 megawatts b the year 2000. This expected range is wid because there are uncertainties associated wit the amount of generation that can be induce with a given level of incentive. Although th expected contribution is relatively small wit respect to the overall system, the contributions t northern communities could be significant. Onc again, the north may well be the beneficiary o some of the new generation, and the south i going to be the place where it is needed.

Purchasing power from a neighbouring prov ince may be an option worth pursuing if a attractive price can be negotiated and transmis sion lines built. However, the final price ma depend on the market forces, and it is expecte the competition from US utilities may driv prices to levels high enough to make th purchases uneconomic. I have sat in on a fe American public power meetings, and they say

/e won't build, because we will get increased wer from Canada and we can use gas to pplement."

Coal generation will be increasingly expensive efforts are made to satisfy commitments to luce the system emissions of sulphur and rogen oxide from 500,000 tonnes per year to 5,000 tonnes by 1994. This target may well ve to become lower if the United States plements new programs for air and water llution control. That seems quite likely when u look at the programs of the two parties in the ited States.

New coal-burning stations will require scrub-s and they will add about 15 per cent to the st of the plant. As a result, new coal plants will st approximately three quarters that of a clear plant. Retrofitting existing stations will very expensive. A program to retrofit 12 ubbers on the existing major coal units would st several billion dollars by the year 2000 and ild increase rates, as we figure them out, by e per cent.

In the future, meeting acid gas regulations nomically will be increasingly difficult if a nber of new coal plants are built. If coal-nerating capacity increases substantially, costs l increase because of the emission control uirements. As well, sludge and ash disposal l become a major problem. I just heard you king about that. There really are no good wers to it. More controls would be required existing plants and more expensive and anced emission control technology would be ded on new plants, as we see it.

f demand continues to grow at a high rate, it is ng to be impractical, past the year 2005, to et this growth with only coal units unless there breakthrough in acid gas control technology. spite of the impending increased costs, some l plants may still be required if demand tinues to grow at a higher-than-expected rate. takes 12 years from the conception to the npletion of a four-unit coal station, but the it unit could be on line five years after struction starts.

Fossil fuel units, including oil and gas eration stations, may be the only major power rce available in time to meet demand, but h oil and gas, from my information, are ected to rise significantly in the 1990s, and really should be careful about large-scale mitments. I watched what happened to gas summer as a result of the US utilities inning to use a tremendous amount of it to duce cooling. The price went up and demand started to increase. It is being predicted that the gas bubble is ready to disappear. When that happens, you will see the price of gas jump considerably and very, very quickly, because there will be people with some long-term contracts who will be fed first.

At this time, in our way of thinking, nuclear appears to be the lowest long-term cost option for large energy production, by a substantial margin. Ontario Hydro's calculations have shown that any plans to meet the expected demand reliably in 2010 which do not include nuclear generation will cost, at present values, about $5 billion to $6 billion more. If the present high-growth rate continues, the penalty of not building new nuclear stations may be in the order of $10 billion.

In order to have the ability to meet the high-demand forecast economically, work should commence as soon as possible on preconstruction of new nuclear stations. If demand growth continues at its present high rate, Hydro's Candu technology may be the only option which will economically reduce acid gas emissions. Because of the amount of time required to complete a nuclear station, there is a need to start the planning activities for new nuclear stations on existing sites as soon as possible, if reliability is to be maintained in the high-growth scenario and further use of fossil fuel minimized.

The predicted demand growth for 2010 can be met by new nuclear capability without building any fossil fuel plants, but if demand continues in its recent trends, it will be very difficult to avoid using fossil plants because of the longer lead time required for nuclear. If there is a decline in growth in the mid-1990s, construction could be delayed or units could be completed individually. If demand growth declines after much of this construction is completed, the surplus capacity could be used to replace fossil fuel generation so that fuel costs and acid gas emissions could be reduced.

A commitment to eventually build a new nuclear facility in the near future would help maintain Canada's Candu technology capability. Without any reassurance from Ontario Hydro, many nuclear suppliers and personnel may permanently withdraw from the industry and make future production of Candu reactors considerably less feasible and more costly. We have had a few examples of our technicians disappearing in the past when we have not supported technological growth in this country.

The House of Commons standing committee on energy, mines and resources has recently recommended that the Candu nuclear option be maintained and supported, because of its predictable cost and environmental advantages over coal. They also believe that much of the public's perception of nuclear safety is erroneous.

As you know, the Hare commission report has confirmed that the Candu design is safe and that this fact should be conveyed to the public. The problem of nuclear waste disposal is also a major public issue, but the standing committee felt that this issue is immaterial when assessing the need for new reactors, because the additional nuclear waste produced would not greatly affect our requirements for our nuclear waste disposal method.

I and the people I have talked to in the organization still have major concerns about what we are going to do with nuclear waste. In terms of nuclear plants, from what I hear in the public, that is the biggest concern they have. Although public opinion must be considered, we feel that the public should be better informed about the issues.

In particular, it should be recognized that the use of nuclear power will contribute to lower long-term costs under the expected scenario. Because Hydro's nuclear cost estimates are being questioned, we support the government's initiatives to conduct an independent inquiry into the cost so that the public can be reassured of nuclear's cost advantages. We support the government and what you are doing in that area.

Because nuclear plants have relatively high capital costs, the timing of their construction and completion should be carefully planned. Therefore, consideration should be given towards long lead times for new stations. Due to the long construction times for new supply, approval processes must be authorized before the need is certain. Completing planning in anticipation of higher growth is an inexpensive, precautionary measure since planning costs are much lower than construction costs.

Moderately early commitment of hydraulic or nuclear may not bring a cost penalty or have an impact on rates, because it could be used to displace expensive coal. Because of the uncertainty in estimating the amount of new supply that will be needed, efforts should be made to streamline the approval process for new supply options so that lead times can be reduced and planning flexibility improved.

Environmental approval of all Hydro's capital projects is a statutory requirement. The process involved in seeking approval is determined l government. Because there have been instanc where delays in securing approvals have result in high cost, it is evident that an improvement this process is needed. Considerable dela should be minimized, because the econom implications may be far-reaching.

In particular, efforts need to be made to redu unnecessarily long delays in approving ne transmission facilities. The unforeseen delay approval for new transmission facilities at t Bruce centre has resulted in an increased cost about $100 million per year. I do not kno exactly who is to blame, whether Ontario Hyd should be starting much sooner to go through environmental hearings or not, but somewher somehow, in our process there is somethi going wrong. That is an area that really needs be fixed.

1650

To minimize environmental impacts, Hyd should attempt to reduce new interregional bu transmission capacity needs when choosing sit for new generation. However, it should recognized there are tradeoffs which must made between site and transmission requir ments. Power purchases from Quebec a Manitoba would require substantial increases interregional transmission facilities, and resi tance to the new transmission line may ma purchases unfeasible. We are also talking abo the long length of the transmission lines and t problem that causes.

One reads about the days and some times week of brownout, the problem that Hydr Québec has when one of its major transmissi lines goes down. You can begin to see t problems we might have running lines fro Manitoba to southern Ontario or from northe Quebec down through Ontario. Therefore, tran mission approval should be an integral part any new generation approval process so th commitments to new supply options are not ma without appropriate transmission requirement

As a corporation serving the public, Ontar Hydro must be committed to timely publ consultation with respect to its plans. Howeve care must be taken so that the interests of customers are equally considered. When taki into account social acceptance of new plan Hydro should consider the values and expect tions of the majority rather than any particul special interest group.

With respect to social acceptance, we agr that Hydro should be committed to do what it c to minimize damage to the environment in

eas of operations. Environmental issues are of ime importance in this province, and we realize at. Nevertheless, Ontario Hydro should only ve to meet environmental requirements that vern all segments of society. Hydro should be lowed to operate, as much as is feasible, as a ivate corporation in order to maintain its st-effectiveness.

For the high growth scenario, it has been termined there will likely be a shortfall of pacity in 1996 and 2001 in the order of 2,000 to 000 megawatts. Due to the lead-time con-raints, it is expected this would result in a mporary decline in reliability. I just want that to nk in because the present reliability target is lected by balancing the cost of interruption to nsumers with the cost of supplying additional serve generation.

In an intensive study done by Ontario Hydro rried out in the 1970s, it was determined that e optimum balance between these two costs is a neration reserve of about 25 per cent. Overall sts increase by four per cent when the reserve ses to 38 per cent or drops to 19 per cent. oreover, when the reserve capacity falls below per cent, the decreasing level of reliability creases the expected cost dramatically.

If reliability deteriorates, continuity of elec-city supply could not be guaranteed. New ads would not be accepted and industries with liable electricity requirements would relocate itside Ontario. Deterioration of system reliabil-, we have noticed, is longer and there are more equent power interruptions. These would usu-ly occur during peak periods, and peak periods e in the daytime in the summer and from five to ven in the winter.

In a province-wide survey, it was clear that stem reliability was a major concern. The iblic would prefer a surplus of generating pacity rather than a shortage. I do not think ere is any doubt in that. They want to be able to home and when they turn the light on, it comes 1 and no problems.

The Ontario Municipal Electric Association lieves that plans should be made to consider e probability of continued growth at the present gh levels but with contingencies to allow a duction in supply that is required. A study on e effective lead times in the face of uncertainty d load growths stated that planning activities ould maintain the ability to satisfy a load owth about 1.5 per cent per year more than they pected. This is approximately the rate we have en experiencing over the past few years. Therefore, efforts should be made to meet a load growth of at least four per cent to the year 2005.

Before I conclude, I feel it is important to address what we believe is the key to a successful public power utility, and that is power at cost. The Power Corporation Act requires Ontario Hydro to sell power at cost. The act establishes principles which attempt to ensure a fair and equitable cost allocation between different classes and generations of customers. These principles have evolved over a considerable time since the early 1900s and have been based on cost causality.

The consistent attitude of the municipal utilities has been centred on this concept of equality and fairness and we are dedicated to maintaining the power-at-cost concept.

The principle of power at cost has provided an important plane against which all activities can be judged. To manipulate this concept will make it almost impossible to assess Ontario Hydro's effectiveness.

Designing rate structures to attain particular social objectives should not be allowed, and Hydro should not be used as an instrument of social policy.

Economic development programs subsidized by Hydro would invariably lead to increased cost and it is unfair to expect the electricity users of this province to subsidize these programs.

Planning for Ontario's future energy needs represents, as we see it, one huge challenge, one that requires us to balance some very important priorities: Number 1, the environment; number 2, the cost; number 3, reliability, and 4, need. To a large extent, how well we manage to balance all of these is going to determine Ontario's economic future.

The Ontario Municipal Electric Association hopes its efforts have been helpful to you in planning our future. And I leave you with one last thought: Like you, I am an elected individual and I firmly believe that the citizens of Ontario will not tolerate, nor should they, an electricity supply shortage. I urge you to maintain the reliability of supply very high on your agenda. Thank you for listening to our concerns.

Mr. Chairman: Thank you, Mr. Anderson. We have some time for questions. Are there any questions from the committee?

Mr. Runciman: Mr. Anderson, you mentioned the gas option and you indicated your concerns in respect to the potential for dramatic increases in costs. We have had testimony before us this week and the previous week in respect to Consumers' Gas and TransCanada PipeLines

indicating today a proposal of Ontario Hydro and other individuals and firms involved in that business, that they are talking about a 20-year contract which would be the price tied to the price of electricity. I am just wondering how you respond to that as a utility. Would you find that a little more attractive?

Mr. Anderson: I am not just too sure, and I have listened to part of the presentation that was previous to this, I do not see that as new technology. You likely know more about it than I do because my background is not engineering, but maybe Mr. Bowker would care to comment.

Mr. Bowker: Probably you are talking more in terms of economics. I think we have seen over the past couple of decades some rather wide fluctuations in cost of petroleum fuels. My concern would be that if there is a tremendous rush to get on the train of low-cost gas fuels, the costs would necessarily follow market pressures. If we can get favourable prices on gas on long-term contracts at today's sorts of prices that would extend over a major fraction of the life of a plant, then obviously that is an intelligent thing to take advantage of. If you cannot, then other options look more desirable.

I think it is interesting to note this association has usually not got themselves particularly involved in telling Ontario what kinds of plants they want. They have rather taken the attitude that we should work toward a common desirable state of affairs for the delivery of electricity to the citizens of Ontario, and whatever environmentally, politically and socially acceptable means are used to get to that end, should be considered acceptable and Hydro should be permitted to do that.

1700

Mr. Anderson: Yes, I think if you are asking the question, if they can give Ontario Hydro long-term guarantees on the price of gas, then we are into a different story.

Mr. Runciman: Well, you have come down today on the side of nuclear generation. You indicated in terms of a large-scale facility–

Mr. Anderson: Yes.

Mr. Runciman: The position that has been put to us in the past couple of weeks in terms of not only the economics, but also the lead time and flexibility of gas generation is very attractive, if indeed you can secure long-term supplies at prices that are not going to go through the ceiling.

Mr. Anderson: Personally, I see gas as something we are going to have to go to in the short term because gas generation can be broug up very quickly and very easily. But as long-term solution, I do not see it. Now, may we are all guessing.

Mr. Runciman: Well, one of the oth concerns, I am sure you have heard this as we in terms of increasing our dependence on nucle generation is the too many eggs in the bask situation and insufficient diversification. I gath you do not have any concerns in that respect.

Mr. Anderson: I have not heard any concer from the people in our–

Mr. Runciman: We even had Dr. Ha express a concern about that this morning regard to–

Mr. Anderson: Well, I do not think you w ever go all nuclear. I think if you did, you wou be asking maybe for trouble. I think there going to be more of it and more of it througho the world.

Once again, from my visits to the Unit States and my connections with the Americ Public Power Association and from some of th conferences that I attend down there, I a beginning to see the Americans turning arour now, although there has been a non-nuclear thi and the cancellation of a plant in Long Island ar one of the other areas. But I am also beginning hear a revival for the use of nuclear power in th United States. This is even from some of th consumer groups. There has begun to be change. They begin to see that there are oth problems and they begin to realize that acid ra and other problems involved with the productio of electricity are going to be worse. If you can g nuclear plants that are safe–part of the proble has been the way the United States has construc ed plants that has created that antagonism. B that is beginning to change and people a beginning to say there are places in the worl where they have safe plants, where they do n have these kind of problems where they tak care, and there is going to be a change.

Mr. Runciman: You do not see an earl commitment to significant new nuclear facility a having a negative impact in respect to discoura ing the bringing on stream of other optio simply because there will be seen to be little nee or justification for that to occur?

Mr. Anderson: The earliest I see a nucle plant coming on is the early 2000s. If our growt continues at the rate it is, we are going to need lot more production by then out of somewher We are going to get some of it from bits an pieces, from demand management issues, fro

ew generation, cogeneration, and the new ower production at Niagara Falls. I really think e earliest we can be looking at a new nuclear ant is in the 21st century in Ontario. We are oing to need to look at other forms in the eantime, there is not any doubt. It is too late ow.

Mr. Runciman: North York, or at least one of our commissioners, has been rather vocal about ydro's debt situation.

Mr. Anderson: My partner, Jack Bedder, es.

Mr. Runciman: He has made some allega-ons in respect to them not having a real debt payment plan. Of course, going the nuclear ute, obviously, has the most significant impli-tions in terms of increasing that debt. I gather our partner is alone on this issue. Have you no ncerns?

Mr. Anderson: No, I think we disagree. This s never come before the whole of the Ontario unicipal Electric Association at any time, but it s certainly been talked about among the embers. Maybe there should be a greater mmitment to repayment of debt and a steady payment of debt by Ontario Hydro, but I have ot heard anybody committed to increasing rates 8 per cent in order to start paying debts back.

Mr. Runciman: If I can just get this in, you n respond to it, too. You talk about power at st and whether the rates are truly reflective of at. I guess if you took Jack's argument that rhaps the rates are not reflective of the real cost terms of a continuing growth of the debt, then rhaps there should be some reflection, some mmitment in terms of reducing that debt over a ng period of time through the rate structure in a ore meaningful way than is occurring now.

Mr. Anderson: I think if we start talking out debts and governments and organizations, e look at the federal government, we look at the ovincial government, we look at local govern-ent and we look at Ontario Hydro. You do not ok at North York Hydro.

Mr. Runciman: Local government is forbid-n in that sense.

Mr. Anderson: They have debentures, but if u look at North York Hydro, we have no debt.

Mr. Bowker: I think it should be pointed out at this association does have a stand on the bt. We have been concerned for quite a number years about the debt and, in fact, became ncerned when a fraction of your hydro bill ent to cover debt. It was about 30 per cent. Now it is creeping up to around 50 per cent. It is of concern when you see not only a large fraction of the money you pay going to cover that, but an increasing fraction.

Mr. Runciman: Other than expressing a concern, have you suggested any way to deal with it?

Mr. Bowker: Only once a year at the Ontario Energy Board hearings, and when we get an opportunity to bend an ear.

Mr. Anderson: Maybe Charlie could comment. He works at the OEB hearings for us.

Mr. Macaluso: We have recommended, for several years now, for Hydro to increase its cash-flow coverage ratios and its interest coverage ratios.

We recognize that we have a debt situation that is very large. There is no shortcut answer to the problem. A 10 per cent, 20 per cent or 30 per cent increase in rates, which would probably get the debt down to where we would like it, is unrealistic.

We have recommended some changes to the ratios, in terms of how much money they have put aside in net income towards debt reduction, which is a long-term solution. However, we feel that if Hydro would follow that proposal, we would get to a debt situation which I think the people of Ontario would be comfortable with.

The details of that proposal can be found in our energy board arguments. We would be pleased to make those available to the select committee if that is the wish.

Mr. Runciman: I would personally like to receive that. I do not know about anyone else.

Mr. Anderson: We will provide that.

Mrs. Sullivan: I was interested in MEA's position that Hydro should not be used as an instrument, basically, of economic or social policy. It seems to me that, although this does not particularly relate to the DSPS, there is a bit of a conundrum here, particularly in the past history of Hydro where it has made a significant contribution in terms of technology transfer which has ultimately had a beneficial economic effect on the province as a whole.

I am wondering–particularly in light of the Premier's Council recommendations just a couple of weeks ago, which indeed recommended that Hydro use its procurement policies to identify and assist emerging industries to come to fruition and increase technology transfer–if you would still feel that Hydro should be out of that kind of activity.

Mr. Anderson: There are some things that Hydro can do in terms of energy efficiency where it should be doing it. You may well count that as part of the social aspect.

I guess I get a little worried about the kind of scenario that says, "If you are going to locate in northern Ontario or in a depressed area of the province somewhere else, we will give you power at 20 per cent less than you would get anywhere else in order to create growth."

In effect, the rest of the province would be picking up that bill. That is just repugnant to most of the members of the MEA. It may not be repugnant to the ones in the area that might benefit; but then you begin to say, "If that can happen up here, then there should be another kind of program down here," and you begin to use Ontario Hydro for social agency work.

I think in the past there have been attempts by governments to begin to try to tax electricity. I think there was one in Ontario a few years back and I remember a certain minister having to back off very quickly. There has also been talk about it at Ottawa from time to time, and whenever that happens I am just inundated with people saying, "What can we do?"

1710

Mr. Runciman: Do not suggest it to Bob Nixon.

Mrs. Sullivan: I think we have made enough revenue moves for a while.

Mr. Bowker: I think there are two aspects to this social support. When we have an industry locating in Ontario, quite often, even for a private industry, we will take into account the fact that it is generating money and jobs in the province. What you say is, "Look, if you will locate in Ontario, we will offer these kinds of inducements, because we know that it is in the long-term economic benefit." However, you do not usually say, "If you will locate here you will get them, but if you locate there you don't." Ontario Hydro is in much the same sort of position.

As an association, we have been quite proud to be associated with Ontario Hydro under the circumstances wherein, no matter where you are in Ontario, be it Hearst, Dryden, Thunder Bay, Toronto, Ottawa, Windsor or Leamington, you are going to pay the same prices for your electricity. There is no discrimination among our citizens on that basis. We feel that nondiscriminatory approach should be continued. Nobody in the province should be disadvantaged. By the same token, nobody should be particularly advantaged by virtue of his position.

On the other hand, when we have purchas made in this province from suppliers, we have recognize too that it is of some benefit to all t citizens in this province to create jobs and p taxes within the province. I think some allo ances should be made. Ontario Hydro has do this quite openly, in a specified way, for number of years. It is entirely acceptable.

Mrs. Sullivan: Further to that–to sort of mo us into a different area–when you were discu ing the demand management programs y commented about equal benefit for all consu ers. I am wondering if, by example, we might r see demand management programs or conserv tion programs that indeed work better in so regions of the province than others. In fact, are going to be talking about marketing. The are going to be some things that will be mo effective in one place than another, first of all n only in terms of division of the customers, b also in sectors of those divisions. By example, the industrial sector, perhaps the certain ince tives or programs that were designed specifica for the manufacturing segment would indeed useful and could not be applied across the boa I am wondering how you see your argume about equal benefits when incentives are n going to be able to be universally applied.

Mr. Bowker: There are two ways of looki at that. If the electricity rates Ontario Hyd charges a municipal utility or a large industr customer of its own are the same, regardless where it is in the province, and are structured reflect the cost that Ontario Hydro sees generating that electricity, and this is what t business of the time-of-use rates that we a embarking on now is all about, then each util should be able to take those rates and determi how best to deliver electricity to its custome taking account of the local conditions it ha Different utilities will have customers w different characteristics and will choose differe aspects of programs to emphasize. They will be different, but they will all have the sa effect. They will reduce peaks or shift lo appropriately to minimize the utilities' co from Ontario Hydro, which in turn reflect re costs and reduce Ontario Hydro's real nee That should benefit us all.

It is amazing the number of dollars that g moved for small percentages of shifts of loads. is startling.

Mr. Macaluso: If I could add to yo question, I think what we are saying is what need is a wide spectrum of programs so that t different types of industries or businesses

me users who might be able to do something out their demand management will be able to rticipate in the program and so that we will ve enough programs to meet the needs of not ly the various sectors but also the regions. That what we are saying. We would not want a ncentration of programs that deal only to lustry, for example, or just to the consumer. I nk we need to be innovative and come up with ograms so that everybody can participate and fact take advantage of what would ultimately a lower energy bill for that customer as well.

Mrs. Sullivan: I am glad to hear that proach. We have talked at earlier meetings out the problems of, say, the low-income nter, who, in a residential program, may not nefit directly as an individual from incentives t are available in other parts of the residential ld. None the less, for the system as a whole, se kinds of incentive programs are still luable.

Mr. Anderson: Yes, we agree with you.

Mr. McGuigan: I am interested in the logue about using the rates as social policy. I t have to make the comment that at cost, no tax l so on in themselves are social policy, but I more concerned about where rural residents nd. A number of years ago I think there was a per cent difference in cost towards rural idents, and then as a matter of social policy, Davis government cut that in half to 15 per nt. Is that still in effect for rural residents?

Mr. Anderson: Yes, it still is and it still kles a number of municipal utilities.

Mr. McGuigan: I guess as a representative of ural constituency, I would have to say I am in our of some measure of social policy.

Mr. Anderson: The problem comes when nebody big annexes you and you lose that, as ppened to me in Barrie and Innisfil. You ldenly lose that and your rates just go whoops. u are in the same place and you are the same son, using exactly the same power from the ne sources. I empathize and sympathize with ı. If I were in your position, I would like it too.

Mr. McGuigan: Our goal is to take another 15 cent off.

Mr. Bowker: Maybe we should equalize the perty taxes too.

Mr. McGuigan: Well, we have not measured se.

Mr. Macaluso: I would like to make a nment on that whole rural differential, be- ise it is something that our association has been studying ever since it was first introduced in the Legislature back in 1981 or 1982. We recognize this difference, and we are looking at some of the problems that it has created. I am not sure if a lot of people are aware of it, but I am going to take this opportunity to point it out. In fact, what has happened is that in a lot of the municipal utilities, the urban dwellers, who pay towards this subsidy, have higher rates than those people they are subsidizing. That has been one of the domino effects that this differential has created. I just wanted to point that out.

Mr. McGuigan: How does that come about?

Mr. Macaluso: Well, because there are municipal utilities. What we are dealing with are averages. It is the average rural compared to the average municipal, and an averages is exactly what you have. So the municipal utilities, which are in the higher end of the spectrum, because they too have higher local costs, are in a situation where they are subsidizing customers who have a rate cheaper than they have. That is a problem that was not foreseen at the initiation of this program.

Another thing too which we are looking at to solve this problem is that we see ways in the way in which Ontario Hydro is organized and we see ways in the way rural customers are serviced that perhaps some closure of those differences can be made without subsidization, just some better cost-effective ways of serving that group. We are aware of that problem, but we want to let you know it is causing us a problem too.

1720

Mr. McGuigan: How is that held in place? Is it mandated? What is the watchdog to see that you guys do not–

Mr. Bowker: Legislation.

Mr. Anderson: Legislation.

Mr. Bowker: The formula is built into the Power Corporation Act.

Mr. McGuigan: A particular constituent's case comes to mind. A chap who had an egg-grading station required a lot of hot water. He was on the edge of a small municipal electric group. Because he was a large user in such a small total unit, they could not get him rates that would compare with other fuels, whereas, according to him, if he had been part of a large unit, that could have come about. I just wonder if you could comment on that.

Mr. Anderson: It is rather interesting because that is one of the problems we met with this morning. We met with people from the Ministry of Energy, the Ministry of Municipal Affairs and

Ontario Hydro to begin to look at that very problem of what happens when you suddenly get somebody just outside a boundary or just inside a boundary. What can we do to begin to alleviate that? We have a large number of places within the province where those kinds of problems arise. We have begun to dialogue and to look at just what we can do, and our first meeting was this very morning. We were there until 12:30 p.m. today.

Mr. Bowker: I think what we are saying is, "Ask us later."

Mr. McGuigan: So you are recognizing that problem?

Mr. Anderson: Yes. There are a number of problems in the province just like that and, of course, there are others quite different but which create the same problems.

Mr. Chairman: Mr. Anderson, I know you cannot stay too much longer, but I have one brief question. Maybe you can answer it quickly. You have alluded to the fact that the members of your association would probably be the ones delivering any programs to manage demand. If the province were to get into a large program of trying to reduce demand, to get people to shift their habits and so on, would you have some capacity problem with the administration of your utilities in administering that kind of thing or would there be a limit to what you could take off?

Mr. Anderson: No. As long as Ontario Hydro works together with us, we can work out just about any kinds of problems there are. We have problems within our own organization of very small utilities and the exceptionally large utilities. Some of the small ones cannot do the things the large ones can, but the large ones are going to make the biggest difference.

Metro and area likely uses one third of the total electricity in the province. For instance, if you take the Golden Horseshoe area, it is one third. But we also have the little place that serves 110 customers and may have one full-time employee and a few part-timers in the community. That is within our 315 utilities.

There are some problems. What we say and what we are continuing to say to Ontario Hydro is, "Sit down with us, work it out and we will work with you so that your programs and our programs can mesh and we can meet, because if we help to lower your costs, then we will help to lower our costs in the end." That is what we are really after, reliability of service at the lowest possible cost.

But I still come back to this: The minute yo lights do not go on, you are mad, you are ang and you are going to get angry at somebody, a when you get angry, you are going to get ev with somebody. It may be first your lo commissioner–

Mr. McGuigan: Politicians getting even wi somebody?

Mr. Anderson: No. The public gets even wi politicians sometimes, Mr. McGuigan.

Mr. Chairman: Thank you. I know you ha to get on; so I would like to thank your panel f coming in and speaking with us and taking sor time to discuss the issues with us.

Mr. Anderson: Thank you for the opportuni to be here. We will forward the information y have requested. We will get that to you. Thai you very much.

Mr. Chairman: Our next witness is from t Windsor Utilities Commission. Is Mr. Edwar here? Perhaps Mr. Edwards could come forwar Mr. Edwards, Mr. Ray has asked me to pass or message to you. He has had to have a meeti over a pressing corporate problem involvi Windsor and he regrets he is not able to be her

WINDSOR UTILITIES COMMISSION

Mr. Edwards: I will pass on some regrets to The chairman of my commission would like to l here, but someone decided to put Toronto son three or four hours east of Windsor and he w not able to make it. He had other commitments will be speaking on his behalf, if you will.

Mr. Chairman: All right. Perhaps I cou turn the floor over to you.

Mr. Edwards: Yes, fine. We did submit letter through the Minister of Energ (Mr. Wong). I believe he has conveyed that to tl committee.

Mr. Chairman: He has, and I believe this h been handed out to the members.

Mr. Edwards: I have some brief remarks. will not take a great deal of your time. We hav sort of boiled these issues down to a few, perhaj elementary items that are of particular interest the Windsor Utilities Commission. You hav heard much from the Municipal Electric Associ tion. We are also a member of that organizatio so I am not going to try to cover all the groun you just heard. We do appreciate the opportuni to meet with the committee.

The Windsor Utilities Commission is one the 320-odd utilities in the province, I think th seventh largest at the moment. We think from ou vantage point down in the southwest that the

a few unique perspectives we can bring to the nmittee that may not be so evident in other ts of the province. First, of course, is that ndsor is noted for its auto industry. It is vily dependent on that industry and a large tion of the electricity the Windsor Utilities nmission delivers is to that sector. We are aware from our proximity to Detroit of the ch higher electricity prices right in our kyard and of the delicate sort of advantage the relative electricity prices can have.

inally, the other unique thing we would bring our attention is that we are very much in the dow of Detroit Edison's Fermi II nuclear ver plant and that brings a whole different spective to our area perhaps on nuclear power the problems it can create in the sense of lic perception and how that public perception place a strain on power development.

s I said, we just want to make our sentation today based on those factors. We port the positions put to you by the MEA. We a member of the MEA. Certainly, we are in our of a reliable supply of power for our tomers and that is what the association stands

would like to come back to the automotive or for a few moments. In that industry, the words are competition, productivity and lity. I think you will find that competition has ed these industries to carefully manage their s, including their electricity costs. When we ut to these plants, we find extremely limited ortunities, at least in the short term, to rove efficiencies of their electrical processes n conservation and from load management. think most of what can be done has been e, has been forced by competitive forces.

his is an industry that responds to price als. It takes prudent action to minimize its s and, as a result, has done much to limit its te and nonproductivity of electric energy. t industry is highly reliant on electricity to rove the productivity of its workforce, again competitive reasons. They have to have an ndant reliable supply in order to maintain nselves. They are increasing their use of tricity for controls and for robotics in order to rove quality control. We would perceive, n we sum all this up, any action, or I guess inaction, that would threaten that supply of tricity and the reliability of that electricity as ect threat on our local economy in Windsor.

0

hen we notice new industries coming into Windsor-Essex area, and we do get a few, one of the reasons they quite often cite for choosing that location is the availability and price of power in Ontario relative to Michigan. This is a real advantage to us. There are so many other factors where we find we are in a negative position and disadvantage in competing with the US to attract industry. We think the committee and Hydro should take every step to protect that advantage. It has been protected over the past years and that is why we find ourselves in the favourable position we are now with respect to our electricity.

I heard talk earlier of what power costs; certainly power costs, and the lowest, long-term cost has to be continued. With regard to nuclear energy. I do not know how much news of the Fermi II plant gets into Toronto. Certainly, there is much concern in my corner of the province and definitely across the river in Detroit about the Fermi II nuclear station. I think that has heightened the awareness and the concerns for nuclear in the Windsor area. We think every step has to be taken to ensure continuing safety and to remove any uncertainties of Ontario's nuclear power program. We think the time may be ripe for public debate on the issues of nuclear power, but in order for that debate to take place, it is going to require some time and it is going to require that the debating partners have some balance. Otherwise, I do not perceive how we would reach an appropriate answer that best serves this province.

It is from those kinds of observations that we submitted the position set out to you in our letter to the minister, and by him to you. We will move into the area of solutions. We, first and most important, think there is still opportunity to obtain hydraulic power at reasonable costs from our neighbours in Manitoba and Quebec. We know hydraulic power is environmentally acceptable. I think there is still time to resolve the problems created by routing transmission lines. We have to look to the mid-1990s before we are into supply problems on a most likely scenario as it is done. I think these things can be addressed in that time frame.

We realize that purchased power is subject to the price that is going to be set by the highest bidder. The highest bidder in some cases may be south of the border and be prepared to pay much more. However, I did see some crisis in the negotiation for purchased power. I believe they are looking at about 1.95 cents a kilowatt-hour in Manitoba and 1.85 cents–in that range–from Quebec, whereas we are looking at close to four cents for thermal power. If that is the alternative,

hydraulic power still offers some economic advantage.

Hydraulic power is only available where there is proper geographic terrain. It is not generally available. Most of Ontario's hydraulic power has been harnessed. There may be some limited occasions to squeeze some more out of it, but where there are suitable power projects, I think Ontario should be there. I think Ontario should get the commitment and Ontario should get the commitment now before someone else takes over that potential power source.

Also, by taking that approach we see that it will buy some time for Ontario Hydro to reduce, in part, its debt and to provide a sound, long-term financial plan.

We made comments on the electricity rates proposed. Those comments were based on our sensitivity to our customers' reaction to rates. The demand/supply planning strategy refers to tracking costs. We think the customer has to be given a correct signal that will provoke a response that is going to be in his best interest and in the province's best interest. Simply tracking costs may not be an adequate approach.

We are still looking at power at cost, but we think the rates should have the foresight to predict high expenses and to direct the customer in a way that will avoid as many of those high expenses as possible. This is just using foresight instead of hindsight in setting power costs.

I guess what we are after is that when the committee here has done its work, finished its job, our ability to deliver power to a dependent community, which we think Windsor is, as many others are, will not be jeopardized. We do support the demand management programs; however, we do not think there is reliable assurance, particularly given the low, favourable rates for electricity in Ontario, that an adequate response to demand management will be made to avoid supply shortages.

We think increasing price to limit demand, which that leads to, is inappropriate and counter-productive. Customers are seeking satisfaction. They are seeking it through price, reliability and availability. If customers are not satisfied by the demand management programs, they will not be successful. Windsor will be a loser and so will Ontario.

While we are prepared to fully support demand management–and no doubt we will make some progress, both where these opportunities are presently identified and where we can make those opportunities–we do not wish to take the risk if we are unsuccessful. A fail-safe plan must be available. It is only prudent, we think, th supply solution should be approved and sho be available for implementation in minim time. We think the short-term to medium-te solution to that is hydraulic power from p chases.

In Windsor we are also aware, perhaps fi our relationship to Detroit Edison, as well a Ontario, that the power suppliers are gener engineers and professionals who have not alw been responsive to the concerns of custom which come out of our persistence, for want better word, to meet the load.

Ontario Hydro has fared better than the Un States in providing information to our custon and gaining acceptance of certain supply proaches, but I think it has to do more. I thi has to equip itself not only to hear the concern the customers and to analyse those concerns also to help the public understand and knowledgeable of the risk and the reward th associated with demand and supply options.

A proactive stance has to be taken in w there are areas of strength in Ontario. I think this will help reduce some of the anxiety customers do get from lack of information misinformation in many areas. If we hand and gag our utilities, as some want us to do, not think the balance is there for the debate those minority interests or people with ve interests in opposition to electricity to com appropriate answers. I do not think we are g to approach the real solutions that we nee some of the problems that are identified. have talked about nuclear waste or acid certainly those things need solutions and ha be addressed.

That concludes, basically, the directio which I want to try to send you from the Win Utilities Commission. We want to be able to to our customers: "There is a reliable sourc power. We can meet your needs. You continue your lifestyle. Your industry function."

1740

Mr. Chairman: Thank you, Mr. Edw Are there questions from the committee?

Mr. Runciman: Just a couple, Mr. Chair We have had a couple of utilities before us they have all indicated that they actively pr increased market share. Does your utilit likewise?

Mr. Edwards: No, we do not. We do promote increased market share. We do lo the lowest cost to the customer for his en needs. We look at where better technolog

ricity is available that can save the customer : dollars or efficiently improve his competi- position and we will recommend it to him, ie issue of market share is really not an issue us.

e have a very flat load growth in Windsor, a very stable population base. The biggest r that we supply, as I mentioned, is the auto stry. The auto industry does its research and omework very carefully. There is not a e lot we can tell them that is going to ove our market share. Where there are ent technologies, such as heat pumps, it s a better use of energy to a multiplying r. It does improve the return, if you will, on and helps lower rates through the communi- hat kind of thing we will pursue.

r. Runciman: I was curious about one other . You mentioned the power purchase option you mentioned some figures in terms of iations with Manitoba and Quebec. I do not hearing any figures mentioned before. seemed awfully low to me. I wonder if you run those by me and by the committee and then just perhaps elaborate on how came to your attention.

r. Edwards: Okay. Ontario Hydro's pres- osts come straight out of its annual report. indicate hydraulic power at 1.026 cents a att-hour, thermal at 3.99 cents and nuclear 19 cents. I guess the rank is hydraulic, ar and coal. In discussions with Ontario o–and it may slap my fingers for talking out hool, although it did not swear me to any cy or anything–it indicated in negotiations Quebec and Manitoba that it was asking in ec for 1.85 cents and in Manitoba for 1.95

. Chairman: Are there any further ques- I have one. Those figures do seem a little than I thought they were. Would your rt of a purchase option be different if the or the figures set by the market–because mably a purchase of power would have to mpetitive with another buyer and not with st of generating in Manitoba or Quebec– your feelings about buying power be ent if that price were twice as high or three as high?

. Edwards: Certainly there is an upper

. Chairman: I guess what I am asking is, is licated on the fact that it appears, with the s you have, that the power could be bought for less than it could be generated through a coal-fired plant?

Mr. Edwards: I should think we would begin to rethink our position if we saw the price significantly above thermal power and above coal. I have not really elaborated on the nuclear option in Ontario because of the perception that we get there from across the border. I think there are some mixed opinions within the commissions but the general agreement is that nuclear power in Ontario is a reasonable alternative. There is concern, however, about public reaction to it.

Mr. Runciman: You don't want a plant in Windsor, do you?

Mr. Edwards: I have not really heard that. A plant in Windsor might be good for the Windsor economy. I really do not have a position on that, but if there was another event on the scale of Chernobyl, we wonder just what might become of the nuclear industry. We think those questions should be resolved and there should be general agreement that that is the way to go. Certainly we are not opposed to that.

Mr. Richmond: Having recently been in Windsor with another committee, the standing committee on resources development, when we were reviewing trucking legislation, we drove out to the airport and I noticed–I do not know whether it was Walker's distillery, but there is quite a bit of heavy industry, in addition to your auto industry, and we saw some of the auto plants.

Being a rep from a municipal utility, do you feel that there are particular opportunities for cogeneration projects in Windsor and have you embarked upon such projects?

Mr. Edwards: We have recently had opportu- nity to investigate two relatively large-scale cogeneration projects. One used the natural gas cogeneration with steam sales. The prices that the proponent would have to get for his power appeared to be much higher than the present prices at which we buy power from Ontario Hydro. There were economic limitations. He did not reach his economic threshold in order for a project to go.

There is also a discussion in Windsor of energy from waste, because we also have landfill problems, as so many places do. That type of facility would not be supported, obviously, out of the energy produced. It might help defray the cost somewhat, but I do not think even that at the moment has been shown to be competitive with straight landfill, if they can find a site.

Mr. Chairman: Seeing no further questions or comments, Mr. Edwards, thank you very much for coming in and speaking to us today and discussing this issue from the point of view of the Windsor commission.

Mr. Edwards: I appreciate the opportuni

Mr. Chairman: I will adjourn the commi to Elliot Lake.

The committee adjourned 5:48 p.m.

CONTENTS

Thursday, September 22, 1988

SELECT COMMITTEE ON ENERGY

rman: Carrothers, Douglas A. (Oakville South L)
Chairman: McGuigan, James F. (Essex-Kent L)
n, Michael A. (Algoma-Manitoulin L)
ton, Brian A. (Hamilton Mountain NDP)
atz, Sam L. (Durham East PC)
, Ruth A. (Etobicoke-Lakeshore NDP)
ındola, Gino (Willowdale L)
Michael C. (Windsor-Walkerville L)
iman, Robert W. (Leeds-Grenville PC)
, Larry (Frontenac-Addington L)
van, Barbara (Halton Centre L)

titutions:
urdais, Linda (Etobicoke West L) for Mr. South
sella, Tony (Dovercourt L) for Mr Matrundola

: Manikel, Tannis

, David, Consultant; with Passmore Associates International
nond, J. M., Research Officer, Legislative Research Service
er, Lewis, Research Officer, Legislative Research Service

lesses:

idual Presentation:
r Dr. F. Kenneth, Chairman, Ontario Nuclear Safety Review; Chairman, Climate Program Planning Board of Canada; Chancellor, Trent University

Ontario Hydro:
ughs, Paul, Nuclear Design Engineer
onnell, Lorne G. W., Vice-President, Corporate Planning Branch

TransCanada PipeLines Ltd.:
ll, David, Director, Pipeline Investments and Projects

Consumers Gas Co. Ltd.:
, Frank, Manager, Business Development

Stone and Webster Canada Ltd.:
ms, David Glanville, Consultant

From the Municipal Electric Association:
Anderson, D. Carl, Chairman
Bowker, Arthur J., Chief Executive Officer
Macaluso, Charlie, Manager, Policy Division

From the Windsor Utilities Commission:
Edwards, Kent L., General Manager

Ontario

No. N-20

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy
Electricity Demand and Supply

First Session, 34th Parliament
Monday, September 26, 1988

Speaker: Honourable Hugh A. Edighoffer
Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the ba together with a list of the members of the committee and other members and witnesses tak part.

Reference to a cumulative index of previous issues can be obtained by calling Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Servi Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toron M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Monday, September 26, 1988

The committee met at 2:06 p.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY
(continued)

Mr. Chairman: I call the afternoon meeting order. I will give everyone a chance to sit wn. Our first witness this afternoon is Ambas-lor Ola Ullsten from Sweden, who has kindly reed to come and speak to us today about reden's plans with regard to nuclear energy d the fact that it has decided to decommission nuclear plants over the next 20 years.

Ambassador Ullsten, I would like to welcome u to the committee and say, on behalf of the mmittee, that we very much appreciate your ming today to speak to us. With that, I turn the or over to you. We have about an hour. rhaps there will be some time for the mmittee to ask you questions and engage in a cussion once you have completed your narks.

OLA ULLSTEN

Ambassador Ullsten: Thank you, Mr. Chair-n and honourable members of the committee. m not absolutely aware why you have invited Swedish ambassador to come to this hearing, t if it was in a search for a foreign country in ich the energy situation is about the same as in tario, the pick of Sweden may not be npletely out of place, as a matter of fact.

The size of population is about the same and spread of population is also about the same. in Ontario, the south of Sweden is very nsely populated and the north is more or less ld and rather sparsely inhabited. The standards living, I would think, in Ontario and in eden are about the same as well and so is, tainly, the industrial infrastructure or the conditions for industry. So is also the currence of forests, of mines, of land for riculture, and to some extent at least, waters fishing. At least as far as the demand for ergy is concerned, we would have very much same experiences.

On the supply side, we have in common shing rivers that have been tamed to produce dro power to a large extent. In the case of eden, we get about 40 per cent of our ctricity through hydro power. We, southern Ontario and Sweden, have also turned to nuclear for production of electricity. As far as I have found from reviewing various statistics, there are actually few regions in the world where nuclear energy plays such a significant role as it does in Ontario and Sweden. Actually, it is about the same.

Another similarity probably is that neither of us has oil, although you belong to a country that has an abundance of oil and petrol products. We both have uranium, the difference being, of course, that we have decided, for various reasons, mostly selfish reasons–price being one, environmental considerations the other–not to use our uranium, but rather to import uranium from Canada, predominantly from sources in Ontario.

That brings us to one of the main differences between Sweden and Canada as far as energy supply is concerned, and the same goes for Sweden and Ontario, at least to some extent. We are, unlike you, heavily dependent on imports for our energy consumption and that leaves its mark on our energy policy situation.

Yet there is also another major difference between the two of us, and one that makes Sweden a rather spectacular actor among energy performers. That may be the main reason I have been asked to come to this committee, as I was asked half a year ago to go to a similar committee in Ottawa, and that is that we have decided to do away with all of our highly effective nuclear power stations in 20 years' time from now.

As I think I have already mentioned, nuclear represents about 40 per cent of our electricity supply, which is the equivalent of about 15 per cent of our total demand for energy. That supply then has to be replaced by other means of energy sources. When it comes to energy planning, as you know much more than do I, 20 years is a rather short time.

Why did we put ourselves in this position, first, of being more dependent than almost any other nation on nuclear, and then, being the first nation to decide to go completely non-nuclear? Is that not, you may ask, an incredible waste of resources, of capital in particular? That is a good question and it is understandable if it is asked by people who are aware of the complications of energy planning and energy policies.

The answer is that the dismantling of the Swedish nuclear program, or the decision to go non-nuclear rather, was not an economically based decision. It had to do with people's fear of a nuclear disaster that would affect millions of lives, a fear that was spurred by what we thought had happened at Three Mile Island in 1979 and what actually did happen at Chernobyl in 1987, a fear that may be rational or may not be rational, but that exists and did express itself in a distinct and unequivocal way. In fact, this is one of the first times, if not the first time, at least on a large scale, when what seems to be economically and technologically rational had to give in to the strength of arguments that are predominantly emotional.

I think there is more of this to come. Sweden is not the only country in which opposition against nuclear power may be strong enough to force a change in current policies, and nuclear power most likely is not the only field of applied advanced technology to be challenged by people's fear of the unknown. It may even be argued that the burning of fossil fuels constitutes a better-documented threat to the survival of our planet than does nuclear, so the oil industry and the coal industry may be next in line to be exposed to the winds of change.

In this context, it may be worth while mentioning another sign in the sky in Sweden very recently. Last week, when we had our national elections, a new political party entered the Swedish parliament, the first to happen in 70 years in a parliament that has been probably the most unchangeable in the democratic part of the world, and maybe also for that reason one of the most boring institutions, politically at least, in the world. It has now been joined by a new party, the so-called Greens. There is no doubt that the reason they managed to get in and to overcome the four per cent barrier that exists for parties to be represented on the national level in parliament was people's concern about environmental problems.

Then the question is, of course, why did we at one time, and that was not that long ago, embark on such a comprehensive nuclear program, now to be decommissioned? Strangely enough, the reason was to a large extent a similar kind of consideration that has now been made and out of which has come the conclusion that the program should be decommissioned.

Swedish industry developed at a high speed during the 1950s, 1960s and 1970s. Energy was an inexpensive component at that time, when oil prices were less than $10 a barrel, and seemingly there were vast hydro power resources to exploited. The use of energy increased something like 4.5 per cent per year from 1945 1975. Since then it has stabilized and nowaday is even going down a little bit, at least comparison with economic growth, the growth the gross national product.

A mixture of environmental and hard-f economic reasons put a rather abrupt stop to t situation of cheap energy. People who wo today be called environmentalists opposed exploitation of all our beautiful rivers. At le some of them should be saved for generations come. The awareness of the devastating effect our environment of burning fossil fuels, be it c coal or wood, started to grow.

Nuclear power, for the environmentalists, people with environmental concerns, seemed be the answer at that time. It was clean. It w quiet. It was a relatively inexpensive source energy. The government had full backing fr all political parties and quarters, and indeed fr industry, when it embarked on a nuclear progr that would soon produce more than half Sweden's demand for electricity, or at least per cent of it.

The oil crisis at the beginning of the 1970s, course, did not seem to weaken the arguments a rather expansionist nuclear power progra Still, it was in the 1970s that the environmen concern more and more turned towards nucle power, the kind of energy sources they had s of reached for not many years before that.

The anti-nuclear-power movement gre strong not only in our part of Europe but also all of Europe, at least in the western part of it, a in Sweden it even gained the full and rath passionate support of the then major oppositi party in the national parliament. What for a wh seemed to be a rather lonely, although succes ful, crusade by one party soon gained groun within all parties actually.

So when, in the wake of the Three Mile Isla accident in 1979, a referendum was held a ye later in Sweden, no one any more defended t very same nuclear program that everyone, le than a decade before, had been all for. All t three options in that referendum—we had thr options for the electorate—contained a no nuclear power. The differences were about t circumstances under which it should be ca celled, in particular the speed at which it shou be cancelled.

After the Chernobyl accident six years late the government even decided to dismantle two the reactors ahead of time. Again, the wish to g

l of nuclear power became an overriding ncern that made economic considerations, as ell as other environmental considerations, her subordinate questions.

20

What will this mean to the energy supply in e of the world's most industrialized nations? e government's overriding policy in response that situation is that the development and mpetitiveness of Swedish industry must not be opardized by a shortage of available energy. at is the overriding goal. For that purpose, a mprehensive program of energy conservation ll be launched. It is already under way. search in the field of alternative energy urces should be stepped up, for which govern- ent funds will also be available. In the first tch, so to speak, there will be $30 million a ar in allowances for industries that have nbarked on those problems and a framework r government guaranteed loans of about $80 llion per year.

The use of indigenous energy will be pushed, particular peat, of which we have an abun- nce, and waste, of which we also have an undance. There will be an energy policy that vocates limitation of the use of electricity in uations where electricity can be replaced by ner sources of energy. The only fields where ctricity would be used would be in fields ere other sources could not be sufficiently ed.

Since we also have a policy of making rselves less dependent on oil, for political asons and for price reasons, where other energy urces fail, the answer is coal. It is estimated at the use of coal, which was almost nonexis- nt in the Swedish industry supply balance 15 ars ago, in 1995 will cover more than 10 per nt of the total energy supply out of some 400 awatts of energy, which is the current total nsumption of energy in Sweden.

What will it mean to the environment that you e dismantling nuclear and moving over to other urces of energy? First of all, the decision to go n-nuclear is coupled with what are probably e most strict targets ever to be undertaken as far emission controls are concerned.

As far as acidulent emissions are concerned, ey must not be increased at all due to the shift om nuclear to other sources of energy. Even a tle more coal, for instance, may have to be ed. During the parliamentary process, parlia- ent even amended yet another environmental straint on our energy planners; that is, that the oduction of carbon dioxide must not exceed its present level. Carbon dioxide, as you know, cannot be cleaned so it is produced in absolute relation to the burning of fossil fuels, be it from coal, oil or gas.

How this is going to be possible I am afraid I cannot tell you, but what I can tell you is this, and I will end my introduction by these remarks: Protecting the environment has become and has to be, obviously, the major factor for energy planning in all countries. I would also say and suggest that socially and technologically ad- vanced countries like Canada and Sweden, and that goes of course for Ontario and Sweden as well, carry a special responsibility in this respect.

Mr. Chairman: Thank you very much. Are there questions from the committee?

Mr. Cureatz: We will try to ask questions so that they do not specifically get into public policy but are more of a general nature to reflect some of the witnesses' ideas that have been coming forward to this committee.

The first thing that strikes me, of course, is that I remember only too well and upon occasion in the odd speech I have made reference to your country, since a large nuclear station is being built in my riding and it was reassuring that a country as well-founded and established as yours is continuing along that path. Of course, it is now of more significance in terms of a different direction, and I am wondering if you might tell us the approach that your country has taken in terms of the mix of looking at the production of electricity.

Notwithstanding you have said to replace electricity by other means, which would be my follow-up question, my first overall question is: Has there been sort of a categorization to say so much percentage will then be coal, so much peat, so much you anticipate would be to conservation, that kind of breakdown? Of course you still have some nuclear, do you not, or are they all being phased out?

Ambassador Ullsten: I think it is difficult to answer the question, because we have no, how should I say, exact target for this. What I can say is that to even it out, let's say by the year 2010 when all nuclear plants should be decommissio- ned, if we would consume by then the same amount of electricity as today, in the area of 40 per cent of that demand would have to be supplied by other means than what is the case today, because we do get electricity out of our nuclear plant to an extent of 40 per cent, as I have already mentioned.

Then the question is, how can that gap be filled? One thing is conservation, which is

important and has proven to be successful over the years since the oil crisis. While conservation has been successful, maybe not in terms of saving electricity because we have rather moved over to electricity to save other energy sources, still conservation is always a means for reducing the need for energy, be it electricity or something else.

There is also a deliberate policy, which I touched upon very briefly, to try to avoid using electricity where other sources can be used, for instance in heating, where we more and more are going over even from block heating to district heating. Individual heating is very rare, actually, in Sweden these days. That saves a lot of energy, and various sources can be used.

Waste sounds like a minor source of energy, but actually it is not. I think we have a prediction that says that by the year 1995, or maybe the year 2000, I do not remember, as much as 10 per cent of our energy demand–not electricity demand, but energy demand–could, at least theoretically and probably even practically, be met by burning of wastes in incinerators.

I mention indigenous fuel, which has some significance as well, and peat moss. Waste, of course, is one of them; peat moss is another. Both can be used for production of electricity as well as for heating.

Since the policy, as I mentioned, is to see to it that a shortage of energy will never weaken the competitiveness of the Swedish industry, the government has committed itself to see to it that there is a reserve of other installations that can produce electricity. From what I have been reading and trying to understand, that is almost exclusively coal, so what we will have to do, if we do not believe that all other methods taken will be enough to supply the electricity needed, is to have as a reserve coal-fired plants for the production of electricity.

That is the answer and, of course, that creates a little bit of a dilemma, as I see it–and that is a personal remark, actually, but I am involved or I would not make it–for those who claim that going non-nuclear is something you do entirely for environmental purposes. When you replace nuclear-produced energy by coal-produced energy, it is not that easy to say that you have done anything good for the environment. This is the dilemma we are facing.

Mr. Cureatz: My last question–I am sure other members have questions, and you have limited time–is about the evaluation of the problem of acid rain with the production of electricity by coal, since your country, as indicated, is very similar to ours in the kinds c dilemmas that we are both facing. In Ontario, ou Minister of the Environment (Mr. Bradley) ha told us from time to time about his concern about acid rain. I am sure there must be simila concerns existing in your country.

Ambassador Ullsten: Yes, of course. Aci raid is caused mainly by sulphur, isn't it? Sulphu can be cleaned, obviously, and as I think mentioned, there is an overriding sort of target c policy that, whatever energy source is to be use to replace nuclear energy, it is not supposed t increase the emission of–well, I do not know th terms–

Mr. Cureatz: Particles getting into th atmosphere.

Ambassador Ullsten: –sulphur and nitrate that is, acidulent emissions in total. That, c course, requires heavy investment in emissio control devices of various kinds. The problem is of course, as you are well aware, that acid rain i not only homemade. It comes from othe countries as well. It reaches Sweden from othe countries as well as it reaches Canada from othe countries.

Mrs. Grier: Mr. Ambassador, I am ver interested in knowing how this decommissionin is going to proceed. You have a storage facilit for nuclear waste, I understand. I do not kno enough about it to know whether it is fc high-level nuclear waste. How do you plan t deal with the issue of contamination once yo start decommissioning?

Ambassador Ullsten: This is a kind c problem in two phases. One is to take care of th waste and the other is to take care of all th decommissioned reactors. It may be a simila problem but as far as waste is concerned, th policy is that the fuel from a nuclear reactc should be stored for 40 years in–I am not sure c the term but to a layman it looks like a bi swimming pool and it just sinks down in it. It i supposed to stay there for about 40 years, whic means that probably some of the radioactivity i cleaned off, and after that it will be encapsulate in copper and put into storage 500 metres belo the surface in our mountain areas.

The capsules are to be inserted into tunnels an the tunnels packed with a material which i almost as hard as the rock itself, maybe eve harder, as it always expands a little bit. It i considered safe for every practical purpose. A least that is what the technicians and the peopl responsible for the project claim. The opponent claim it is not, because it may sort of trickle nc

wn but up, will enter the ground water and this d that, so that in 10,000 years' time it may ach the surface. Who knows if that is right or t.

Anyway, that is as far as we have come to signing a concept for storing of nuclear waste. has not been put into use yet, since we have a idterm, or whatever you call it, storage for 40 ars for some of it. Before we decided to take re of all of it, rather than sending it over to fining facilities in Britain and Germany, we nt some there for a time. The rest is already ing stored in these big basins, but going from ere into the final storage has not occurred.

Mrs. Grier: Has a location for the final orage been decided upon and identified?

Ambassador Ullsten: It is a difficult thing to , as you as politicians are fully aware. henever they try even to make test drilling, ere is a lot of opposition because people do not ant to have it in their region, so that is going to a political problem. There are a lot of ountains and hardrock in Sweden.

Mrs. Grier: How many of your reactors are ivately owned?

Ambassador Ullsten: I was trying to find that it when I was preparing myself for this. I think is half and half, actually. It depends on what u mean. Six reactors of our 12 are owned by a own corporation, six are owned by a private rporation, but that private corporation has a lot shares which are owned by local municipali- s and semipublic interests, so it is half private, lf public.

Mrs. Grier: How is that going to proceed? e first one you are doing, is it Barseb ck?

Ambassador Ullsten: Barseb ck.

Mrs. Grier: Is that a private one or public?

Ambassador Ullsten: That is a private one.

Mrs. Grier: Who is going to do the decom- issioning?

Ambassador Ullsten: That is the nature of wedish capitalism; that is, Sweden is a privately vned country to a large extent, more than most her countries, but private companies have to ick to quite a few rules as far as what they are pposed to do and not supposed to do is ncerned. Everything that has to do with clear power is guided through legislation. As re, you have to be commissioned, have a cence, a permit to start it off. There is a constant spection carried out by state authorities.

There is now legislation, passed in Parliament, at the plant should be decommissioned and they have to stick to that. They will be compensated in certain ways. When I say that these utilities are private, it is not that you have a lot of private people or companies that are shareholders in those companies; usually they are communes, properties, this and that. It does not have the fabric of a typical private company.

Mrs. Sullivan: First, I have a supplementary to Mrs. Grier's last question relating to the decommissioning of the plants. I understand that Sweden, much like Ontario, has a program whereby there is a sinking fund or a fund to which the operating plants paid money to be used in decommissioning and waste removal. I assume that fund was set up to last over the period of time of the economic life of the plant. Since the economic life of the plant is no longer the term of life of the plant now, where is the extra money going to come from? Will that come from government to handle the actual decommissio- ning?

Ambassador Ullsten: I am not sure they have sewn that up completely. I have seen figures of what it is going to cost to decommission two of the reactors ahead of time, because those two reactors, which are both on the west coast of Sweden–they are very close to Denmark and actually there is a lot of pressure from Denmark to have them shut down–are going to be shut down before they have run out of use, if I may speak like the layman I am.

Of course, that amounts to an extra cost. You are not making full use of an investment that could still be made use of, and that has been estimated to be something in the area of $800 million or $1 billion.

How they are going to compensate the company that owns the Barseb ck and the Ringhals reactors, I do not know. The Barseb ck is the one in question because Ringhals is owned by a crown corporation.

1440

Mrs. Sullivan: Those questions are yet to be decided?

Ambassador Ullsten: They may have been resolved already, at least in principle, but I do not have the answer to that.

Mrs. Sullivan: The next question I have relates to the public policy process itself. I was interested in reading the referendum questions and it appeared to me that the public policy decision to no longer have nuclear plants indeed had been made and the referendum, in fact, related to how the decommissioning or moving out of the nuclear program would take place. I

wonder if you could explain more of the process, and whether indeed the process involved, by example, any consideration of the energy side of the question or whether it related to environmental and safety questions.

Ambassador Ullsten: It was a long process, although it lasted over a rather short period of time. While there was not a sort of formal decision taken by Parliament to go non-nuclear before the referendum, what Parliament did, actually the same year as the referendum was held, was to decommission, in a way, the effect of a government bill. You have a term for it in Canadian parliamentary language. You have a bill there but you leave it idle, so to speak, you do not do anything about it.

That bill reflected the majority in the Swedish Parliament. The majority, and there was a vast majority, had decided as late as 1979 that we should have 12 reactors and that we should, of course, be aware of the safety aspects of nuclear power and all this and that, but it was not about abandoning nuclear power. There were a lot of question marks put into the bill.

Then the same majority, which was an informal one in a way, decided to have a referendum. The procedure in the Swedish Parliament is such that for a decision on a referendum you do not need a majority; you can have it with less than a majority, but there was a majority of two thirds, I think, or even more in favour of a referendum. Then the issue, as such, developed in a way that in the meantime–and that was after Three Mile Island had occurred–all the political parties, including those who had been behind the government bill–and we have a proportionate system in our country as you know, so there are many parties sometimes behind a government bill–changed their minds. As you notice yourself, the referendum was not about whether to remain nuclear or not, it was rather in what way nuclear should be abandoned as as an energy source.

To put it very simply, I think it is correct to say that there were three stages in this nuclear process, and it has elapsed over a time span of less than 20 years. First, everybody was enthusiastic about it; then parties and people got more and more sceptical, gradually. After a while, everybody was against it, and then we decided to shut it down.

Mr. Beer: When you launched on this route, clearly there was, because of the nature of the referendum, a consensus within Swedish society about nuclear power, which I do not know would be necessarily similar to that in Canadian society, in that the question posed was not, "Should we o shouldn't we?" but, "How do we go about it?"

I am interested here in terms of those who wer involved in the nuclear industry, the relativ numbers of people who were engaged in th nuclear industry and what kinds of plans hav been set out and enacted to retrain workers, t move people from, in some cases, I woul imagine, various high-technology kinds of posi tions; really, in a sense, to take that whol industry and move those people into othe positions and to do that with the least amount o turmoil and harm to the overall economi system. I take it there was, if not full acceptanc by the nuclear industry in Sweden, an under standing that that was the way things had to g and, therefore, they were going to have to worl with the government on developing ways o moving their people into other kinds of energ employment or other kinds of employment at all What did you do in that regard?

Ambassador Ullsten: The main concern i actually that all the safety standards have to b met as long as the nuclear power stations are run That is to say the government has undertaken t guarantee that there is a sufficient number o knowledgeable people around to do that. O course, they are to a large extent supplied b private industry. Most of the Swedish reactor are built by Swedish contractors, by ASEA-ATOM, for instance, and others, and they have the responsibility of maintaining their installations as long as they are running.

Whether we will be able to do that withou having to rely on experts from other countries maybe is a problem, because if there is no future for somebody who is an expert in nuclea technology in Sweden, it may be difficult t recruit those people. I do not think that is a majo concern as of today, because there are still 2 years to go until all the nuclear plants are cancelled or dismantled and a lot can happen in the meantime, but there is a concern, and it was mentioned in general terms in the last government bill, which suggests that two of the reactors should be decommissioned ahead of the deadline, the year 2010.

It is like most of those questions. It is difficult to get a precise answer. There is a problem built into that situation. You have a technology which requires a lot of highly skilled personnel and you have decided ahead of time to abandon that technology; of course, that is going to have some effect on people working in that field. That is quite sure.

Mr. Beer: Has there been no commitment by e government in terms of future employment r people in those industries?

Ambassador Ullsten: No. That is not a rious concern. It may become a problem in due ne, but we do have some experience in that eld in Sweden. We are constantly undergoing dustrial changes in Sweden. Less than 10 years o, we abandoned the whole Swedish shipyard dustry because of outside competition, and all e people who were employed there are nployed somewhere else today. I should not y this is an easy process, but it is a process for hich there is a mechanism that has proved to be ther effective so far. Of course, it depends on e economic situation and the employment tuation in general and this and that, but there ver is such a thing as a government guarantee at anybody should for ever have the job he has day or even get a replacement. There is, owever, a policy of full employment which has en very successful.

450

Mr. Beer: A final question. Over the last year 18 months, there has been increasing concern d discussion about the ozone layer and a mber of things which are happening which are ing to warm up the earth. There has been some scussion among scientists and engineers, some whom have been mildly, if not strongly, tinuclear, that because of that we are faced ith very difficult choices but that perhaps iclear energy has to be re-evaluated in that ntext.

I was just wondering whether, to your owledge, during this period within Sweden ere has been any discussion of reviewing the licy which was enacted or if there is any eaningful opposition to it, given what some ould feel are different circumstances because of e warming of the earth's atmosphere.

Ambassador Ullsten: Yes, there is a debate ing on. I think that debate is going to become en more intense and more in focus because, as u rightly mentioned, it is about the warming of e climate, and that is a relatively new area of vironmental concern which has not been taken to account very much so far. We have been aling so far–and I think we have come quite far d so have you–with emission controls and eaning up of sulphur, nitrogen and what have u. There we have the technique to do it and so rth, and it is a matter of how much we can ford.

When it comes to the so-called greenhouse ses and those gases which have an effect on the ozone layer, the major one as far as warming of the climate goes is carbon dioxide. Carbon dioxide cannot be cleaned at all; so everything that goes up there stays up except the half absorbed by the sea and by man, animals and biomass; the rest of it stays up there and it may cause in due time the ultimate environmental crisis for us.

To answer your question, I think the more that message is spread and people start looking into it, the more complex will the whole environmental issue be and the less obvious will it be that it serves the environmental protection interest to decommission nuclear power altogether. That is my private prediction of what is going to happen in the political arena, of which I am not any more a part.

Mr. Charlton: I think it is useful for all of us to hear about the process you have gone through politically and to discuss questions like employment adjustment in Sweden. As you have suggested, it is an ongoing part of government responsibility in Swedish society to play a major role in that process.

I think probably the most important aspect for this committee, though–what the consequences of the decision to phase out and dismantle the nuclear electrical energy program in Sweden have for this committee–is the programs which will be developed to replace the nuclear program in Sweden. I guess the greatest extent of interest to me and probably of interest to most of the members of the committee is the old argument about what is possible and what you can achieve when you do not have to as compared to what you can achieve when you do have to.

I think specifically in that reference about your comments about the major commitments the Swedish government is making around conservation and cogeneration and other aspects of the programs it is developing to replace basically the hole that is left by the nuclear phase-out. I understand you are not an energy expert and are also not there as part of the political process, developing those policies and programs, but are enough of those programs far enough along that through you we could get access to information about specifics that are being developed in terms of conservation, industrial cogeneration programs and other things?

Ambassador Ullsten: Oh, yes. The conservation program was started in the wake of the first oil crisis in the early 1970s. I do not have all the figures available now, but let's take one example. In 1973, the proportion of oil in the Swedish energy supply was about 70 per cent. It has come

down to something like 53 per cent today and is estimated to come down to 40 per cent in 1995. All of it is due to conservation efforts, insulation and introducing new techniques in the process industries, and this and that. That has proven to be very successful.

I think you are right in phrasing your question, "What can be achieved when you are bound to do it and what would happen, anyway?" I think you need a stick to do anything. That is the nature of human mankind. Industrialists are no different.

There was a need to save energy to become less dependent on oil for two obvious reasons. One, the availability was not very secure at that time. At least that was how we saw it. The other was that the price was going up. The price of oil during the 1970s went up 20 times. You can imagine if you have an energy balance sheet that tells you that 70 per cent of all your energy comes from oil and the price of that oil goes up 20 times, it rocks the economic charts quite a lot. That triggered off a process that proved to be very successful.

I am quite certain that when industry is faced with this new situation, that it has to make its calculations without counting on nuclear 20 years from now, it is probably bound to come up with other solutions. What has until now been ignored as sources of energy–I mentioned waste and I mentioned peat–is suddenly becoming, if not the major source, at least of some significance.

I can give you a few figures. For instance, energy forest still is not used at all. For the year 2010, we estimate that we are going to produce enough to provide five terawatt-hours out of the 400 that is the total need estimated for that year. I mentioned wood waste and bark before. That used to be 19 per cent in 1982. It is estimated to be 43 per cent in 2010, etc. Peat was almost not used at all. In 1982, it was 0.2 per cent. It is estimated to be 35 terawatt-hours in 2010.

Probably the answers are there. All this has been achieved because there has been pressure to do just that. I also think the shifting in use of electricity will also take place for the reason that the price of electricity is bound to go up, due to, among other reasons, the dismantling of nuclear. But those are for the other obvious reasons.

1500

Then there are the more spectacular energy sources like windmills, which we are trying and testing now. They have built a high-rise, ugly one just close to my summer place in the Baltic island of Gotland. They are planning to build another two test projects. On the mainland, we are also testing a few, but this is still on almo[st] the experimental level.

Solar has proven to be not so farfetched f[or] local heating purposes. You cannot transm[it] electricity from solar very far because of the lo[ss] of capacity, but for local heating it has proved [to] be rather promising. Still, you need to do a l[ot] more research. I think, again, when there [is] pressure on you to do that research, at least wh[at] can be achieved will probably be achieve[d] because there will be economy in it and there wi[ll] be a need to do just that.

Mr. Charlton: Thank you very much. An[y] data that you could help us access in terms of th[e] conservation programs that went on in the 1970[s,] any current programs and the developme[nt] process that is going on now in the prese[nt] situation would be really helpful to us.

Ambassador Ullsten: One ugly prospect [of] this for you who are politicians, is that, at lea[st] for market economies, the best functioning to[ol] is the price. If you would like to cut down the us[e] of energy, you have to raise the price. If we wer[e] to sell gasoline as cheap as you do in Canada an[d] the United States, we would probably not b[e] having such nice figures to show you as far a[s] decrease in oil consumption.

Mr. McGuigan: I would like to thank you[,] Mr. Ambassador, for coming. You mentione[d] that Sweden has a proportional representatio[n] system. I just wonder if you can give us a sho[rt] background. When was it brought in? Yo[u] mentioned also that your parliament was boring and I just wonder how it could be boring with tha[t] system in effect. Also, what role did th[e] proportional representation system have in thi[s] decision? I wonder if you can just give us som[e] general comments on that.

Ambassador Ullsten: To start with, th[e] proportional system has been there for ever, o[r] since democracy was introduced in Sweden[,] which is the case in most other Europea[n] countries as well, with the exception of Grea[t] Britain. When I say it was boring or unchanging[,] it was that since the turn of the century we hav[e] had the same five political parties and they hav[e] had about the same representation in terms o[f] percentage of votes, which has created a ver[y] stable political situation in the Swedish parliament. The first new party to enter into the system since democracy was founded, which was at the turn of the century, is actually the Greens, wh[o] managed to overcome the problem of reaching four per cent of the national vote.

Mr. McGuigan: How much over that did the[y] go?

Ambassador Ullsten: They got something ike 5.2 per cent. But I do not think it had any earing on this particular issue. It was one of the ld, established parties. It used to be a farmers' arty, the centre party that started to criticize the uclear program and then after a while got all the ther parties more or less in line with it.

Mr. McGuigan: You mentioned that the reenhouse effect really was not part of the ecision. As you know, in the past two years, we ave had reduced crops in North America. In act, the statement was made that the world is just ne drought-year away from world famine. What ffects of the greenhouse have been shown in urope? I understand they have good crops this ear.

Ambassador Ullsten: We had a marvellous rop this year. Marvellous weather was felt, not nly for farmers. I do not think it has anything to o with the greenhouse effect, but as I said–I ave read all the speeches that were given at this onference on the environment here in Toronto in une–the effect would probably be more severe or regions like the Nordic countries than for iost other populated areas of the world because ie warming, if I understood it correctly, is upposed to be more significant the farther north ou go.

As I mentioned in response to Mr. Beer, the wareness of this problem is not very significant oday. I think it is still a part of the environmental ebate that is to come and I think the sooner the etter, because it is going to give you the omplete environmental puzzle ahead of you and ou will have to take the considerations accord-ingly, whether it comes to energy policies or any ther policies, because it affects the whole tuation.

Mr. McGuigan: The point I was trying to ring out is that in Europe you have not seen ramatically the results of it like we have seen ere over the past few years.

Ambassador Ullsten: No, that might be the eason. We have seen other reasons, and it is ypical that, for instance, on the west coast of weden and of some other European countries iis summer, thousands of seals were dying from virus, obviously, that had some connection ith the pollution of the sea, which triggered off ie most intense environmental debate, I think, iat has ever occurred.

I just said to myself, "Had it not been the seals, ad it been the drought like in North America, it ould probably have been a debate about the reenhouse effect." Now it was a debate about ie acidulous emissions, not only from the burning of fossil fuels but also from agriculture procedures and traffic and this and that, which is important enough.

Mr. Chairman: Mrs. Sullivan, did you have one final short question?

Mrs. Sullivan: Yes. I wanted to understand a little more how the district heating program works. Do you have to have a community that is very tight, with buildings very close together, for that to be an efficient energy provider?

Ambassador Ullsten: Yes. It goes without saying it is more efficient and makes more sense in urban areas. It has to be in urban areas, actually, to make sense at all, I think.

In other areas, you can have block heating and you can have–in various sparsely populated areas, still I think you have to go for individual heating, but I would think there is no individual heating whatsoever in Stockholm at present, nor is there in any other major city in Sweden.

Mrs. Sullivan: No individual heating.

Ambassador Ullsten: No, I would not think so. It is all district heating, except for maybe some of the residential areas in the outskirts of the cities where you have private homes, but even those are usually connected to some kind of block heating or district heating, because, for obvious reasons, it is less expensive and also, for reasons that may not be the focus of concern of the private house owners but should be for the planners and politicians, it is easier to control the emissions when you have district heating as opposed to when you have individual heating.

Mrs. Sullivan: Yes, that is right. That is so fundamentally different from the situation here.

Ambassador Ullsten: Oh, yes, it is.

Mr. Chairman: Ambassador Ullsten, I would like to thank you very much for coming and speaking with us today and for helping the committee to understand Sweden's plans and how it is going to go about providing for its energy needs in the future. Thank you again for coming in.

Ambassador Ullsten: Thank you.

Mr. Chairman: Our next witness is the Canadian Nuclear Association. Dr. Runnalls, I guess you are the nominal chairman of the panel. I wonder if you might introduce the panel members for the benefit of Hansard. My goodness, the committee seems to have started a new practice. People are coming in with name tags to put on so we do not get confused. None the less, I wonder if you might give us an oral introduction, so it can be recorded on Hansard,

and I will turn the floor over to you for your presentation.

1510

CANADIAN NUCLEAR ASSOCIATION

Dr. Runnalls: Thank you, Mr. Chairman. I am accompanied today by two representatives of the Canadian Nuclear Association. On my right is Rita Dionne-Marsolais, who is vice-president, information, for the association. On my left is Ian Wilson, who is vice-president, technology. My name is John Runnalls, and I am the chairman of the Canadian Nuclear Association for the year 1988-89.

Mr. Chairman: Okay. I wonder if you might proceed. You have a presentation. I believe the committee has been handed out a copy of the document, so if we could go through that, then we will have questions afterwards.

Dr. Runnalls: The Canadian Nuclear Association, which I will call the CNA, is a voluntary membership organization that represents the nuclear industry in discussions with government and the public on matters of interest and concern to the industry. The association maintains close links with similar organizations in the United States, Europe and Asia and provides a forum where representatives of industry, the electric utilities, government, universities and the public can come together to discuss matters of mutual interest.

The 138 members of the association and its 1987-88 board of directors are listed in the last few pages of the package which was previously filed with the committee, I think in July. We have provided or will provide to you copies of the current board membership, which changed about that time, the 1988-89 membership. We will distribute those to you.

Membership in the CNA includes manufacturers, electric utilities, consulting engineers, construction companies, banks, insurance companies, transport companies and nonprofit organizations, such as educational institutions, research laboratories, unions and departments of federal and provincial governments.

Approximately 100,000 Canadians are employed directly or indirectly in the nuclear industry. Collectively, they generate some $4 billion of nuclear-related business annually. This is a level which is similar to that of the chemical industry in Canada or the printing and publishing industry–not insignificant, in other words.

CNA members represent a broad spectrum of companies involved in Canada's energy sector. Nuclear electric power generation is one important component. Uranium mining and applic tions of radiation technology are but a part of t overall business interests and involvement in t Canadian economy.

Many of these companies are also involved the design and construction of hydraulic coal-fired generating stations. They also repr sent a very large part of Canada's industrial bas with interests in the security of supply of ener sources for the production of goods, includi energy-consuming products, and in maintaini and expanding employment and investment their facilities.

In the package which we sent to you in July v included a copy of a brief which we submitted the previous select committee on September 2 1985. That is exactly three years ago to the da In that brief we stated, "The CNA fears that t commencement of the approval process f additional supply facilities after Darlington m already be late to the point where it poses a re threat of constraint on the province's econom opportunities."

Given the very slow progress since the combined with a level of load growth which h exceeded what even we were predicting at th time, the concern we expressed at that time h become even more acute. Since our previo appearance here at Queen's Park, we ha submitted a number of briefs to the feder government and other major public inquirie Copies of some of these are also included in t package sent to you earlier. A number of the committees have recently published reports th call for the maintenance of the nuclear option Canada. Indeed, the standing committee energy, mines and resources in Ottawa went far as to say just recently that this is "vital Canada's interests."

We submit that the Candu nuclear industry even more vital to Ontario's interests. Tl nuclear industry today employs about 30,0(Canadians directly and roughly twice that ma indirectly. Most of these jobs are in Ontario, mining, manufacturing, construction and oper tion right across the province. Given the conce for the environmental aspects of the burning nonrenewable fossil fuels, it would be imprude not to take full advantage of our highly develop nuclear assets for use by both present generatio and those that follow.

We are encouraged that both Ontario Hyd and the Ministry of Energy have come before yc expressing similar views. We are appreciative the supportive remarks made to you last week t representatives of electricity users such as tl

ssociation of Major Power Consumers in)ntario, sometimes called AMPCO, and the Aunicipal Electrical Association, MEA, who mphasized the need to commit additional supply acilities, including additional nuclear capacity.

Just last week, the Minister of Energy (Mr. Vong) was reported as saying that we can put off naking such commitments by concentrating our fforts on conservation and other small-supply ptions. He is partially right. If Hydro's demand nanagement program is successful, it could xtend the date of need for new supply facilities y about four years; at current growth rates, to 996.

However, what is missed here, in our view, is e urgency required in the planning process to ring major new supply facilities on stream efore the turn of the century. The Darlington tation was approved in 1977. It is only next ear, in 1989, 12 years later, that it will begin to roduce electricity. Today, in reality, we are ooking at lead times of 15 years. That takes us eyond the year 2000, well past the projected eed date of 1996.

The Candu industry which we represent today as been a tremendously successful undertaking y Ontario. I have a slide that shows the world ankings for lifetime performance of large uclear units. This is from an international uclear journal published in the spring of 1988, which shows that seven out of the 10 most highly fficient performers in the world, of all those eactors with capacities above 500 megawatts or 00,000 kilowatts, are of Candu design. Candu's ecord is well recognized around the world, and ve stand to capture a large share of the export narket if we can build on our existing competi-ve edge.

We have another slide prepared from informa-on supplied and published by the Organization or Economic Co-operation and Development in aris, which shows an estimate of costs of uclear power in various OECD member coun-ies. If you look over on the right, you will see hat the most economic nuclear electricity nywhere in OECD comes from Canada. It hows that costs in France are also significantly ower than elsewhere; not quite as good as in Canada.

It is not surprising to us that the American epresentatives on the technical advisory com-nittee who appeared before you earlier ques-ioned Hydro's nuclear cost estimates based on heir own experience. You can see that their own xperience, on the left, is not such a happy one.

Ontario has the most successful and lowest-cost nuclear program in the world, and we are confident that a number of members of this committee already recognize this. A majority of Ontarians also recognize this, as you will soon hear. However, more effort is required by our industry to inform the public. This past spring, the standing committee in Ottawa that I referred to earlier criticized our industry for its "failure to articulate the compelling case to be made in support of continued nuclear development."

1520

The CNA appeared before the standing committee on December 1 last year, indicating that the industry recognizes this problem. We have initiated research to find out not only what the Canadian public thinks about nuclear power but also its specific concerns and its interest in obtaining information. Based on that research, we have embarked on a public information program. We have retained Rita Dionne-Marsolais on my right to manage that program and I will ask her to provide results of the research and discuss the nature of our information program.

Ms. Dionne-Marsolais: In 1987, the Canadian Nuclear Association embarked on an information program designed to raise public awareness of the nuclear industry and to create a climate of understanding and acceptance of the industry so that future energy decisions may be made by an informed public in a more positive atmosphere. This information program was developed by a public affairs committee of our association, which basically is responsible for identifying public concerns and needs and ensuring that these factors are considered by the industry and its members.

The objectives of our committee on public affairs are: to monitor attitudes in the community on matters related to the nuclear industry; to have the concerns and needs of the community understood by industry decision-makers; to help the community understand our own industry's plans, policies and activities; and finally, to support the industry's relationship with the community through the provision of centralized communication and co-ordinating services.

That committee developed an information program basically with a strategy that meets four basic elements. First, we want to open an ongoing dialogue with the Canadian public in order to broaden its appreciation of the benefits of uranium and of the nuclear industry. We also want to introduce and familiarize the public with specific current applications of nuclear energy.

We want to present specific facts about application of nuclear energy which will aim at describing how it will improve Canadians' wellbeing today and tomorrow. Finally, all our efforts in the information program will be monitored in order to have a specific evaluation of the impact of our program in relation to the response of the public concern.

Our program is valued at roughly $3 million a year. It has five main components.

The main thrust of the program, of course, from a financial point of view, is advertising in the print and television media across Canada. I hope you have had a chance to see that advertising. The philosophy of the advertising is nonadvocacy and it is relatively soft, but it represents a commitment on the part of our industry to share information with the public.

The second part of our program is an education program; that is the second bulk part of it. The education program is to ensure that nuclear energy is adequately presented to students at different levels of education and to provide students with direct access to our own information general line. We do have an 800 number which the general public, mostly students and teachers, use.

The third part of our program is a speakers' bureau where we seek speaking engagements for CNA spokespersons and our members in order that the community at large can hear it from the people who are in the industry.

The fourth dimension of our program, closely tied to our advertising, is media relations. There again, we want to gradually familiarize journalists with the active information program, indicating that our industry is prepared to talk to the public and has something worth while to say. We know that has been a reproach by journalists in the past.

Finally, we want to monitor the response. Do we succeed in meeting the general public's need for information? In my final remarks, I would like to show you the table you have in your package, which describes the result as of May 1988 of the survey which was made through Decima Research, in which we wanted to determine Canadians' attitudes towards the use of nuclear energy to generate electricity in Canada and also to assess Canadians' views on our industry. That survey was done between April 30 and May 7 and was made among a proportionately representative random sample of 1,200 adult Canadians across Canada.

I have on this sheet the results for Ontario and for Canada because, as you know, any serious information program for Canada must be look at from a regional perspective. We have iden fied regions so we can monitor and evalu regions which are familiar with nuclear pow and those which are not.

We find interesting results here. From Ontario perspective, Ontarians are knowledg able about nuclear energy and recognize it important as a future source of electricity. Th are familiar with the detrimental effects coal h on the environment and they are confident th nuclear safety systems are capable of protecti the public. If there is one province that unde stands and accepts the nuclear industry, it Ontario. Residents agree that the industry ope ates safely, even with nuclear power stations close neighbours. Almost all Ontarians a interested in learning more about nuclear energ

If I may, let me run through the main questio here: 64 per cent of Ontarians favour nucle energy as one of the ways to generate electricit That compares with the Canadian average of per cent. Eighty nine per cent of people Ontario believe that nuclear energy will somewhat or very important as a future ener source for that province, compared with 76 p cent for Canada. Also, 81 per cent of Ontaria believe nuclear energy is a good or realis choice for large-scale use now in Ontario. Th compares with the Canadian average of 71 p cent.

I think these results are quite significant an will just end my comments by giving you al some monitoring results we have had from o 800 line or our mailing. As I said, in o advertisement we indicate an 800 toll-fr number across Canada and we also give o address so people can write to us with concer and questions they would like us to address. Un the end of July–that is, between January 19 and July 1988–we had about 1,700 reque across Canada, 700 of which came from Ontari We have distributed in Ontario alone rough 7,000 information packages like the one y have received today. I think it does indicate th Canadians and Ontarians mostly want mo information and are capable of absorbing it a giving us feedback.

Dr. Runnalls: One of the alternatives nuclear power is the purchase of power fro neighbouring utilities. As the results of o research indicate, some people believe there i very large potential still to be developed in o neighbouring provinces. We sought informati on remaining potential from the Department Energy, Mines and Resources in Ottawa, an

ould ask Ian Wilson to present that information) you now.

Mr. Wilson: Mr. Chairman, we have a slide how here. We obtained from Energy, Mines and esources a listing which it had obtained from ie various provinces' provincial utilities as to ie remaining economical hydroelectric potential hich each province had identified. We comared that with the kind of load growth we have een over the last four or five years in the various rovinces and over Canada generally.

This chart shows a very simplistic view of that formation. It talks about the number of years of irther load growth which could be sustained at urrent load growth levels within the various rovinces. You will see that in provinces such as fanitoba, British Columbia and the mainland of ewfoundland, there is a very large potential still emaining in terms of the number of years of istained growth it could meet.

However, when you look at Canada as a whole nd look at the load growth across Canada as a hole, you would see that if we developed all the conomic potential right across Canada, we ould meet approximately 16 years of the kind of ad growth we have seen in the last four years, n average, for the whole of Canada.

530

More specifically, and getting closer to home, we look at Manitoba, Ontario and Quebec and lk about the prospect of being mutually ependent on each other and making use of the djacent province's hydraulic resources, we stimate from these figures that we could meet pproximately 11 years of the combined load rowth that we have seen in Quebec, Manitoba nd Ontario, on average, over the last four or five ears.

What is quite remarkable about this, perhaps, the figure for Quebec, where there is a erception that there are vast resources left still to p. In fact, when you look at the figure, there are pproximately 90 terawatt-hours of capacity still ntapped in Quebec, including the second phase f the James Bay project. The load growth irrently in Quebec is running at around six rawatt-hours per year, and six into 90 quite mply gives you 15 years of potential growth, at e kind of growth we have seen in the last 15 ears. I think the perception is that there is much ore than that. In fact, what this indicates is that ven Quebec should be starting to look now at ptions beyond the full development of their conomic hydraulic potential.

Dr. Runnalls: In summary, I would like to esent a final slide which is similar to the one that was shown to you last week by the joint industry task force, but in a slightly different form. This version was prepared by the Department of Energy, Mines and Resources in Ottawa. It shows the date on which the Ontario Hydro system will fall below a reserve margin of 25 per cent for various rates of load growth. We agree with the presentations of various industry groups that we have all been lulled into a sense of complacency by the recent load forecasts of Hydro and the Ministry of Energy, which are proving to be far too low and had been so for the past six years.

There is an urgent need to inject a greater confidence in Hydro's ability to supply the needs of a growing Ontario economy. Ontario's home-grown Candu system offers a proven option which commends itself to your consideration on the basis of provincial employment and environmental considerations. I hope I have made it clear, along with my colleagues, that there is an urgent need for an early commitment by Ontario.

Mr. Chairman: Thank you. Are there questions from the committee?

Mr. Charlton: There are a couple of questions that I have. The first one, I guess, relates to Mr. Runnalls's presentation at the outset, where essentially he was saying that we may have some serious time-line problems and he specifically used the Darlington example as an example of how long it takes to bring a nuclear facility on line.

I wonder why you would use Darlington as an example of the problems we may have in the future when in fact, in this committee, Hydro's own testimony, both in the fall of 1985 and again this year, suggests that the time line on Darlington relates more directly to slowdowns that they caused in its development and construction process because of the changing circumstances that they faced.

Dr. Runnalls: Perhaps I could answer by saying I believe that the Hydro officials, if asked the question, "What is the lead time with respect to a new station?" would say that it is probably between 10 and 12 years for a coal-fired station and between 12 and 15 years for a nuclear station. The numbers that Hydro would quote, without any reference to an earlier example, fit with the ones that I have suggested to you.

I said that the evidence so far suggests that the lead times for nuclear stations are very long in Ontario. They are likely in the future, we think, to be longer because of the injection of more regulatory requirements than had to be met in earlier years. We are not optimistic that, given

approval for a nuclear plant tomorrow, that plant could be in operation before 2000.

Mr. Charlton: I think I understand what you are saying. I think I understood what you were trying to say in your presentation as well. I am not sure why you did not just say it the way you have just said it instead of trying to use the Darlington example where we have had clear testimony that there were intentional delays in that process. It just muddies the whole issue.

Let's go back for a minute to the question of what Hydro might or might not say. I put it to you that your group is here presenting serious concerns about perhaps being too late in making some of those decisions about major new supply, yet Hydro seems to be going through a process that it is perfectly capable of handling in terms of the time lines it sees.

How does one relate to the other? You suggested a moment ago that if we ask Hydro how long it will take, they would say, "Twelve to 15 years for a nuclear plant." It is their package of information that we are dealing with here before us. It is their planning process that they are going through. What is it that you are suggesting about Hydro at this point?

Dr. Runnalls: I do not think I am suggesting anything about Hydro. What I am suggesting is that, from what I have read of Hydro's submissions to this committee, I believe Hydro has already said here that it is already too late for Ontario to follow the most economic option for new power in this province. It is already too late for that.

This is not to say we cannot have power that is more expensive. Our neighbours across the lake in Rochester and across the river from Windsor in Detroit pay twice as much as we do for electricity. I think what the Hydro people are saying, as far as I read, is that they do not feel they can have a new major supply source in position in time to meet their projected need; therefore, they are going to have to rely on alternatives that are going to be more expensive.

Mr. Charlton: That is certainly what they are telling this committee. They are telling this committee that the decision has to be made within a very short period of time, as in the next year and a half.

I do not think it was actually during your presentation–it was probably during Mr. Wilson's presentation–but on one of the slides, you were showing demand growth versus the coming on line of supply and the problems you foresaw as a result of that.

The question you raised is essentially th Hydro has been consistently wrong for the la six years. One of the questions this committ has already asked Hydro, and we will go back them about, no doubt, is whether or not they ha changed their long-term projections in terms demand growth. They have not.

How would you respond to that in terms of th committee's approach to Hydro and Hydro credibility here before this committee in light what you are telling us?

Dr. Runnalls: I am not quite sure I understan what the question is, but what I might say is th the forecasts which had been issued by th economics and forecasting division of Hyd have been consistently low since 1982. Eac year, when it has been proven in retrospect th they had been low, the base has been change that base has been shifted up.

We have some evidence just recently, f example, that if we look at electricity growth Ontario in August 1988 compared to Augu 1987, we see that the growth rate in terms terawatt-hours is 7.3 per cent. That happens to b nearly three times what the forecasting depar ment in Hydro was saying a year ago.

Mr. Charlton: Let me paraphrase for yo what Hydro has said to this committee abo demand growth and the reason it has said it is n prepared to change its long-term forecast in term of demand growth.

Essentially, they have said that having studie economic growth and economic downturn in th province, what they see happening is econom growth that is presently being bunched or heape in the first part of the 20-year period they a looking at. In their view, there are going to b peaks and valleys throughout that period, whic will average out to what their 20-year projectio is basically setting out for this committee and f the rest of Ontario to look at. They a determined to stick to their projection in terms demand growth over that 20-year period, base on the study they have done.

I guess what I am asking you is, in your view what should this committee be doing in terms its relationship with Ontario Hydro and recom mendations about Hydro's approach to deman growth?

1540

Dr. Runnalls: I hesitate to make recommen dations as to what you should do in dealing wit Hydro. What I suggest, however, is that it migh be judicious to pay particular attention to th presentations that have been made to you no only by Ontario Hydro but by the Joint Industr

'ask Force–AMPCO, MEA and the Canadian luclear Association–all of whom have the eeling, along with the Department of Energy, Iines and Resources, that the Ontario Hydro rojections have been cautious, and if they ontinue to be cautious and incorrect for the next our or five years, Ontario could be in a position f having more serious repeats of what happened his past summer; that is to say, when we began to hink very seriously of reducing the voltage in the verall system, having selected power cuts and in ict making public appeals.

All I am suggesting is that it is very difficult, in ie best of times, to be making forecasts, but you o have a number of very pertinently interested rganizations, like large power consumers, who e very important in making this economy so ibrant, who are saying it is much better to err on ie plus side, if you like, when you think about istalling supply capability or, in fact, when you iink about demand management.

We may not be all that different. If you look at iat curve, you will see that if the growth rate for ectricity in Ontario persists for the next four ears as it has for the last six, we come to 1992, id then we ask the question, when is the ojected need date for new supply capability in ntario? It comes as quite a surprise to see that it o longer is a projection, because the need date as already the previous year, in 1991. That is ow critical it is, in our view.

Mr. Charlton: Just one last question. In your esentation, you had a slide up where you set out e figures on all of the available potential in draulic in Canada. The fact was that the entire draulic potential, on average over the whole untry, was capable of satisfying the demand owth for only 16 years. You did not set out for what that was in megawatt-hours or terawatt-urs or the rest of that. Could you tell us, just to ve us a rough perspective, what that would ean in megawatts and, for example, in nuclear ants to meet the same demand?

Mr. Wilson: Off the top of my head I could t, but I would be pleased to provide you with list of numbers from which this particular de is derived. As I said, looking very ecifically at Quebec, I was talking about 90 awatt-hours of available energy from further dro.

As we know in Ontario, when Hydro a number years ago identified the 17 most economical es to bring it up to a total capacity of 2,000 egawatts installed, it was looking at an output om that 2,000 megawatts of something like 550 erage megawatts, and there was a very low capacity factor, much less than would meet one year of sustained load growth in Ontario at the present time. Those are the kinds of rounded numbers that you see in this chart. I would be quite happy to provide the background to this.

Mr. Charlton: We would be appreciative of any further documentation on this package of material that you could provide us with. Perhaps at the same time you could tell us what you used for current levels of increase in electricity demand, whether you were using the seven per cent from this year or the 4.4 per cent over the last four-year or six-year period or what demand growth rate you were looking at.

Mr. Wilson: We will do that, but it did not include this year, which has been exceptional.

Mrs. Grier: I was interested in the campaign that I know you have had and that Madame Dionne-Marsolais described. I know I saw the ads; I cannot remember over what period they ran. When was that mounted? Was it prior to the Decima research you have given us?

Ms. Dionne-Marsolais: We had two waves. I guess I can use that expression. The first series of printed ads ran in the fall. It was almost at the same time as the Decima. In my notes, I indicated that one of our programs was to monitor the response. The Decima research that you see here is the May 1988 survey. That was done after two waves of information, one in print and one on TV.

We also had a survey in October 1987, which hopefully you have also received, because I think we sent some copies to the members of the–

Mrs. Grier: Yes. I had seen it and I see you have included it in the submission you gave to us in July.

Ms. Dionne-Marsolais: Yes.

Mrs. Grier: I was particularly interested to note that, for example, the summary of favourability towards the use of nuclear energy was unchanged from the survey that was done at the beginning of your ad campaign to the one that was done after your campaign. I wondered what kind of an evaluation of your campaign that had caused you to make.

Ms. Dionne-Marsolais: When we do an information program in the way that we have developed and when we deal with an issue–we are not dealing here with a consumer product; we are dealing with an issue–those surveys and the radical change in support are not expected after six months. When we did the survey, we had had January through May or so of advertising.

What we did find, though, and those results are not here because we have indicated only certain numbers of questions, is that in some provinces, not so much in Ontario but in some provinces, we have had an immediate impact on the level of opposition. I will give you an example: In Quebec, for instance, which is a province that, when we began the campaign, was very negative in relation to nuclear energy, we had a very important reduction.

The rest of the changes that we had, particularly in Ontario, are not statistically significantly noticeable, and it is true that for Ontario we did not change very much.

The only element that changed, from memory, from the last October survey was the question concerning the level of untapped water resources available for hydroelectric projects. We had a change in Canada. I do not know exactly the figure for Ontario, but I could find it for you if you are interested. There was an improvement in the level of understanding, probably because of all the discussion in relation to Ontario Hydro's supply and demand considerations. There has been an improvement in the realism of the data.

Mrs. Grier: But in response to the question, "Do you strongly favour or somewhat favour the use of nuclear energy as one of the ways to generate electricity in Canada?" what you are saying is that while there might have been an improvement within provinces, the overall percentage of 51 per cent was unchanged from the percentage before you embarked on the campaign.

Ms. Dionne-Marsolais: Yes, and what I am saying is not an improvement in some provinces, the reduction in opposition was improved, not the support for.

We are working here with an information approach, and as I indicated before, a nonadvocacy approach, so our responsibility and our objective is really to present information. It takes time for you and me, for that matter, to absorb that information and to–there is a progress, as you will see in our upcoming ads also in this fall campaign, hopefully. We address other subjects, different from the ones we addressed last year, in order to present all the elements of the discussion in an energy option choice.

1550

Mrs. Grier: One of the questions in your first Decima report, which I do not think you have summarized for us in this one, was about the believability of the spokesgroups–a dreadful word–on the nuclear industry. It was summarized in table 7, which I think said 90 per cent believed scientists to be very or somewh believable, 70 per cent believed environment groups very or somewhat believable and 32 p cent felt that an association representing t nuclear industry was not believable. I a wondering if you had repeated that question the May survey and what the change had been

Ms. Dionne-Marsolais: No, once we fou out that we did not have a lot of credibility v wanted to know why. The May survey h questions on our capacity to communicate, our openness and what would they like? E province, how did we rate as being open with t public? We did not rate well. How did we, as association, rate at communicating to the Can dian public? We did not rate very well either.

That is why we have developed material. T purpose of those surveys is to allow us influence the content of the information, the w we are going to present it. In fact, we a addressing specific questions that resulted fro those questions. One of the questions we also h in our May survey, which was not in the Octob one, was the reasons for support or oppositio what were the main concerns that the Canadi public had.

Mrs. Grier: How much of the $3 million th the campaign has cost would have come fro Hydro?

Ms. Dionne-Marsolais: Very little actuall because Ontario Hydro has not specifical sponsored this program. It sponsored last ye actually; this year we do not know. The way th we fund our information program is by volunta contributions, where we make a presentation our members and we invite them to sponsor t program. Based on the validity, their intere their understanding of the program and the support last year, I do not believe that Ontar Hydro supported the program directly.

Mrs. Sullivan: Last week, on Thursday, v heard from Dr. Kenneth Hare, following up his recent report. One of the things he raised w the lack of communication between people w are involved in the engineering and nucle science field with other people in the academ community. Indeed, he said that other than f limited understanding, for example, of how reactor would work, there would be very litt information exchange or real understanding the process. I am wondering if you see that as problem and indeed how you would see, in term of understanding, that kind of a separatio affecting the public discussion process in term of operational and waste management safety, f example, and crossover technology.

Dr. Runnalls: Perhaps I could begin to nswer the question, put my other hat on and ndicate that I work over at the University of 'oronto, in the centre for nuclear engineering.)ne of our tasks in the past few years has been to ssess the attitude of young students coming in rom high school and choosing a a way to go vithin the engineering field. We have found omething very interesting.

Fifteen years ago, people would come into a articular course we called engineering science nd decide after two years which specialty they vere going to take. At that time, 15 years ago, ne out of four would choose to go into the uclear and thermal power option. It was very mportant relatively. There were eight options: hysics, computer science, chemistry and so on. t was really quite a popular option.

Two or three years ago, that number had lecreased to two or three per cent from 25 per ent, a 10-fold decrease which we judged was robably a reflection of the general public ttitude that had developed about nuclear power luring that interval. After all, young people oming into university are relatively unskilled, if ou like, in the complexities of many of modern ife processes and the ways to become specialzed.

What we find now, over the course of the last ear or two, is a decided resuscitation of interest n the part of students. This is reflected also in he attitude of the management of the university. ust last week, we from the University of Toronto ave submitted a proposal to the Natural Science nd Engineering Research Council in Ottawa, on joint university-industrial research basis, in ffect to increase the nuclear engineering training nd research facilities in the University of 'oronto by a factor of two. We have the niversity's support to hire young people in nechanical engineering, chemical engineering, nd metallurgy and material science to devote, if ou like, their lifetime careers to the nuclear nergy business.

That is quite a commitment on the part of the niversity and we think that is partly because here is a growing interest on the part of students nd partly because there is a conviction on the art of the management of the university that uclear engineering as a training ground, as a ecessary avenue of life in Ontario, is very mportant. Perhaps Mme Dionne-Marsolais night have something additional to that.

Ms. Dionne-Marsolais: I am not too sure I nderstood your question. I thought you were referring to a gap between engineering scientists and others.

Mrs. Sullivan: Between nuclear engineers and nuclear scientists and people in other fields. Dr. Hare was quite adamant that there is very little cross-understanding of the technology and the science or engineering skills and processes involved.

Mr. Cureatz: Just to clarify that, which was an area of interest to me, the way I understood it was the practical aspects of those engineers in the field, say with Ontario Hydro, not having a rapport with the scientific community at the university level.

Mrs. Sullivan: I think the impact Dr. Hare was particularly relating to was operational safety in plants and the kinds of independent judgement which can be brought into those questions from the academic community and indeed into judgements or later evaluations of waste management programs or nuclear waste disposal programs, for example.

Ms. Dionne-Marsolais: I would suspect that other than the experts or specialists in nuclear engineering, the rest of us, I should say, are all average people in relation to that technology. The source of information is basically what we read in the paper or the information we get through associations or industry associations. That could be one of the explanations. Frankly, it would be very difficult for me to be aware of something like this. I have no comments. I can just explain maybe why it could be so.

Dr. Runnalls: I think I am somewhat more optimistic than Professor Hare on this one. I have discussed this with him many times. We have a rather active program in the Centre for Nuclear Engineering that aims at trying to overcome some of this by having joint seminars which are open to all members of the university–presumably mainly the faculty of applied science and engineering and the faculty of arts and science–and that helps a little.

In more detail, what I have seen develop within the engineering faculty is a kind of interaction between departments within the faculty of applied science and engineering, where there is a natural tendency to be separate from each other. Communication across departmental boundaries is often difficult but what I see is a growing interdependence among various departments.

In industrial engineering, for example, if you were interested in human factors and the relationship of that particular subject to nuclear

reactor control room design; electrical engineering to control systems and safety systems; chemical engineering to the problems of waste management; the problems even at first at the front end of the fuel cycle in looking for and separating uranium from where we find it in nature; interest in mechanical engineering and the mechanical problems, heat transfer problems, pressure tube problems we have heard about in Candu–all of these problems generate interest within the faculty and interaction with industry and with other faculties in the university.

I guess I have come to the conclusion that if you spend an enormous amount of money, as has been done by Ontario Hydro–$30 billion or something like that on the nuclear program–you generate a large number of problems. As someone said to me many years ago, that is what keeps engineers in business, the generation of such problems. As soon as you realize there are problems, there is subsequent interaction which will overcome to a large extent the isolationism Professor Hare is concerned about.

1600

Mrs. Sullivan: I was quite interested in hearing about the University of Toronto's request to increase its nuclear engineering teaching and research capabilities. I have read somewhere, and I wish I could remember where, that there was some concern that the people who are the real experts in the nuclear field are all about the same age and proceeding rapidly at the same ageing pace and that there is a relatively small personnel pool coming into the nuclear field; indeed, very little opportunity for new people to enter the field, actually, as workers and so on. I wonder if you would comment on that.

Dr. Runnalls: That is not a problem specific to the nuclear field. I think if you look at the faculty of engineering at the University of Toronto, with which I am familiar, it is top-heavy in terms of older people. That automatically means there will be less opportunity for young people, because the staff at the university is not an expanding one. The staff is being held more or less constant even though the number of students goes up each year.

This is why I think it is all the more significant when the university agrees in the administrative sense to take on new tenure-stream professors in mechanical engineering, chemical engineering, and metallurgy and material science, which effectively means that the whole population with respect to nuclear engineering faculty members will double.

It is quite significant that they will do this, i one case by actually creating a new position an in the other cases by matching the two ne positions with retirements taking place in 1993 i other fields. In effect, the management has sai "Look, we think there's opportunity here. W think we should try to anticipate what the worl in Ontario and elsewhere will be asking fo years hence when this crop of graduates will b coming through. We want to be ready."

Mr. McGuigan: I wonder if you would mak a short comment about why nuclear facilities i Canada cost only half of those in the Unite States. Is it the Candu reactor? Is it the type c construction they do? Is it the system the operate under?

Dr. Runnalls: To begin with, the Cand reactor is a very sophisticated device which run well, from the slide you saw. It competes in th top of all the big reactors in the world.

Mr. McGuigan: Is it cheaper to build though?

Dr. Runnalls: It costs considerably less t build than the reactors in the United States. Th reason is that the regulatory restrictions on U reactor construction have grown enormousl over the last decade to the point where it ha become exceedingly expensive to be in th nuclear business at all.

There is an additional complication in th American case because of the presence of publi utility commissions which find it difficult politi cally to agree to significant increases in rates which are brought about because of the extende construction schedules, which are brought abou by regulatory intrusion or intervention. If yo look at the costs in the United States, you fin that a great deal of the very high cost in th nuclear plants being constructed and finishe now is due to interest during construction. I those plants could have been built in six, seven o eight years, which is the time the Japanese take t build a similar kind of reactor, for example, th price would be very much less.

The major reason I would say is that there is huge difference in attitude in our two regulator approaches. One of the witnesses before the Har commission, the past chairman of the Nuclea Regulatory Commission in the United States which is basically interventionist, said, "If w have any difficulty with any one of our reacto owners, we say, 'We will see you in court'." It i a litigious kind of approach, whereas th approach in Canada is much more characteristi of our parliamentary system, which says: "Look

we have a problem. Let's see how we can work this out." That makes a huge difference.

Mr. McGuigan: You are not suggesting that their standards are higher than ours?

Dr. Runnalls: No, their standards are not higher. In fact, there are some who would contend that the huge impact of the regulatory authorities in the United States case makes their reactors less safe, because essentially, they are dictating safety by piles and piles of decrees, while we are trying to understand what the principles are. So far, our approach, it seems to me, has been very successful.

Mr. McGuigan: The difference is largely the process, I would think.

Dr. Runnalls: It is largely the process. Some people say nuclear reactors are technically complex, but they are just superduper plumbing jobs with modern-day electronics. Given the right atmosphere and the right support, the Japanese can do it in six years. I remember not too many years ago seeing the construction schedule from Atomic Energy of Canada Ltd. Candu operations, which showed that a commercial reactor under construction could then be built in something of the order of about 70 weeks; that is to say, from the time you first turn the sod until you get the first power, it takes something like six or six and a half years.

Mr. Beer: I have two questions. The first is to Ms. Dionne-Marsolais. In the survey you did, looking at the wording, I am trying to determine what people think about safety. For example, I suppose if somebody had said to me in terms of the third one, "Nuclear energy is a good or realistic choice for large-scale use," I can see a lot of people sort of saying: "Realistically, I guess we are going to have it. It is there and we have problems and so on."

In the material you handed out–I guess it is in the second one called "How safe are nuclear reactors?"–there is the statement: "Nuclear reactors are very safe. There are three basic reasons for this statement." Then you go on to set out what that is. If one had made the statement or if the question had been, "Do you agree with the following statement totally, a great deal, sort of, very little, not at all?" on a statement such as "Nuclear reactors are very safe," I am curious as to what the response would have been.

You do agree that in a nuclear accident safety systems would protect the public. It would strike me that there still is, among most of us, a desire to hope that they really are safe. None the less, the 46 per cent surprises me as being a rather high figure. I am just wondering, in interpreting that within your own association, if it is your view that this questionnaire does give you a pretty firm basis for saying that not over 50 per cent, but none the less a very strong majority really believes the system is safe. Has that changed over the last number of years? It is interpretation. It is the old business of asking: "What is the question that is asked, how is it worded and what do we really understand?"

1610

Ms. Dionne-Marsolais: I can give you the question if you would like. It comes right after when we ask the question, "Do you strongly favour, somewhat favour, somewhat oppose or strongly oppose the use of nuclear energy as one of the ways to generate electricity in Canada?" Following that, we give them a scale where minus five is that they totally disagree with the statement and plus five is that they totally agree with the statement. Zero means that it depends.

The question reads, "Even if there were an accident in a Canadian nuclear reactor, I am confident that the safety and containment systems would protect the public." The mean rating, which is what I think you are referring to, is 0.94 per cent. So it is "it depends" going towards "agree," but it is not very high.

If we look at the figures from a percentage point of view, then it translates into the figures you have there, but it is a pretty precise question. "Even if there were an accident, I am confident that the safety and containment systems would protect the public." The mean rating we get is 0.94 on a scale from minus five to plus five.

Mr. Beer: In the area of safety, you mentioned you are going to be doing further campaigns. Is that something the association is determined that it would like to sort of chart, that you would be focusing other questions in relation to the public's perception of the safety of the reactors?

Ms. Dionne-Marsolais: Definitely, because one of the main concerns of the Canadian public is the safety of our nuclear power plants. In our campaign last year, we had one explicit ad on safety, as you find in there. Our next upcoming ad in the fall is again on safety. This is the most important element for the Canadian public and for everybody: "Is it safe? Can I live next to it? Can I send my children to play in the park next to it?" That is a very important element for us.

The difficulty we have is to try to explain the notion of safety as it relates to each and every one of us in a simple manner because, as you pointed out, in our fact sheets we use a lot of expertise to

try to explain it in simple terms. There is a very fine line that one can cross and become too technical. Then you lose your reader or the person who is not particularly interested in technical matters.

As you know, when you ask an engineer, "Is it safe?" before he says yes or no, he will give you: "It is X per cent risk for this and X per cent for that. Yes, roughly it is safe." What I have to deal with as a public information person is that we try to introduce the notion of safety and put it in perspective with our everyday lives and with the reality of safety of a nuclear reactor, where in reality they rate as safe and safer than hydraulic is, for instance.

Mr. Beer: Are there any data with respect to the impact of Chernobyl on the attitudes of Europeans towards the question of safety and the Three Mile Island problem a number of years ago in terms of North Americans' approach to safety? Can you chart anything in relation to this survey that tells you that Ontarians are different in their view of safety as compared to others?

Ms. Dionne-Marsolais: As you saw in one of the charts we had there, Ontario and France, or I should say Canada, but basically Ontario and France are pretty close. Everywhere in the world, after Chernobyl, there was an impact.

I do not have the figures with me, but I could make them available to you. What we find, though, is that areas, regions, provinces or countries which have nuclear power plants and which have opened the doors and presented information have increased the support of the general public because people had concerns that they could not see what was was going on there. I was quite interested by a presentation made at our annual conference in Winnipeg this year where a representative of Electricité de France spoke about the tremendous effort EDF is putting into getting French people to visit their power plants and their facilities. According to the work they have done, this is the most important element.

When people get a chance to meet the operators and see a power plant and get the explanation on how it works and what happens if there is no electricity, what happens if there is a leak of something, they can see what we mean by a containment system, they can see what we mean by a pressure vessel, they can visualize and then get a better understanding of the mechanical reality of a power plant. They also physically see the distances, the barriers between the house of the reactor and then the site. They can physically identify the different barriers. It is extremely important.

If you are interested in European informatio we do have some data available that we presented at our last annual conference Winnipeg and we would gladly send you t material on that. We had presenters from t United States, Great Britain and France. W talked about public information and the reactio following Chernobyl. They have a longer peri of experience than we do.

Mr. Chairman: Thank you. I think th would be useful.

Mr. Argue: Dr. Runnalls, as a follow-up Mr. McGuigan's question on the differenc between costs in the US and Canada, y mentioned that it was mainly because of t different regulatory processes in Canada and t US.

I was interested last week when a witne presented a piece of evidence from Californi prepared by Peter Morris of A.D. Little, respected international authority in project ma agement. His testimony was on behalf of Pacif Gas and Electric, for which he did a comparis of what he called large complex projects duri the approvals of Diablo Canyon to go in prudency hearings, to put Diablo Canyon into t rate base.

First, I would mention he identified a mu smaller difference between Canadian and Ame can nuclear costs and put it up to the fact that th were mainly done by crown corporations here there was the absence of profit, the tax regin was different and mentioned several other ite in trying to bring it to apples and oranges. showed basically that with the Diablo proje their costs were somewhat lower than some of t Canadian examples if you brought this in. would like to get your reaction to a small quo from his testimony.

In defence of Pacific Gas and Electric's c overruns in that project he said: "Both the scale project size, complexity and volatility a simultaneous interaction of these characteristi make LCPs particularly difficult to manage. these factors increase, so does the likelihood unanticipated events or the probability of erro or failure. It is this greater chance of mistake some type that makes LCPs–large compl projects–especially difficult to manage."

Dr. Runnalls: Thank you very much for th question. It does give me an opportunity, first, correct something that I think I said earlier. O of my technical experts has pointed out that I h said that Atomic Energy of Canada Ltd. peop found it possible, in fact, to build a nuclear pla in 70 weeks. I really should have said 70 month

The other thing: on reflection, I think Mr. McGuigan's question referred to the differential in power cost between, let us say, Rochester Gas and Electric and Ontario Hydro, which is much more complicated than just the difference among construction costs, regulatory impacts, private versus public power associated with nuclear plants. We know that if we look at the US over relatively short distances, we see quite large changes in the power costs. Part of this is due to the nature of the fuel mix, part of it is due to the age of the plants and part of it is due to public versus private power participation. Why is it, for example, that in New York City the power cost is two and a half times what it is in Rochester and in Rochester it may be twice what it is in Toronto?

1620

It is all of those things, but looking specifically at the nuclear scene, and once again trying to compare dollars so that we are looking at apples and apples, one sees there are large nuclear projects in the United States which are nearing completion, which have capital costs that seem to be, on a per kilowatt basis, something in the order of two to three times, perhaps even four times, what we are experiencing in Darlington.

I think of one just on the southern side of the lake down near Detroit, for example, where we have a 1,000-megawatt plant which will cost, the guess is at the moment, in terms of Canadian dollars, when it is finished, in about the same time scale as Darlington, something in the order of about three times the Darlington cost per kilowatt.

It is very difficult to imagine how that can be, except with respect to the huge delays encountered in construction time so that the interest costs during construction become very, very high.

Mr. Argue: For comparison figures, what would those dollars per kilowatt be between the Detroit example and the Darlington example?

Dr. Runnalls: I could make those available to you, if you wish.

Mr. Argue: I would appreciate that.

Dr. Runnalls: Yes, sure.

Mr. McGuigan: Are you referring to Fermi II?

Dr. Runnalls: No, I think it is Nine Mile Point I am thinking of, but I will get those specifically for you, and we do have this report by an expert group from the Organization for Economic Co-operation and Development in which they try to take a dispassionate look at the nuclear power across the whole of the participating countries in the organization.

Mr. Wilson: I was going to say that the graph Dr. Runnalls referred to was taken from the data in this report and the assumptions with respect to construction time and some of these various other elements are described fairly thoroughly in the report. We would be happy to give you the loan of it for a reference.

Mr. Chairman: Dr. Runnalls, on behalf of the committee I want to thank your panel for coming in to speak with us today and for discussing these issues with us and for answering our questions. I also appreciate the fact that you brought in these audio-visual aids so that we would not get confused as to who was who on the panel. Thank you again for coming in.

Our next witness is from Energy Probe. I wonder if I might ask that panel to come forward. Mr. Rubin, would you be needing the overhead projector or anything?

Mr. Rubin: Yes, we have two slides, I believe.

Mr. Chairman: We will leave it there then.

For the benefit of the committee, Energy Probe is here today to speak to us about the question of nuclear costs and various other matters relating to the operation of nuclear plants.

Mr. Rubin, I wonder if you could introduce your panel to us and I will then turn the floor over to you.

ENERGY PROBE

Mr. Rubin: Yes. Thank you. It is a pleasure to be here. I think you have the outline of our presentation in front of you?

Mr. Chairman: This would have been just handed out to the committee, for the benefit of members.

Mr. Poch: It is probably stapled in reverse order.

Mr. Rubin: Does yours start by saying, "Summary of Energy Probe's Recommendations"?

Mr. Chairman: Yes.

Mr. Rubin: Ah, right.

Mr. Rubin: It is in page number order 3, 2, 1.

Mr. Chairman: We do like to get to the point quickly in this committee.

Mr. Rubin: Exactly, starting with the bottom line and working its way up to the title at the top of the third page.

As I believe you will see from our presentation and from that backwards outline of it, we are casting our net somewhat more broadly than initially billed.

My name is Norman Rubin. With me is David Poch. I am director of research with Energy Probe. David is a lawyer who does a great deal of work for Energy Probe and, as well, is a researcher with Energy Probe.

Without taking too long, Energy Probe is an independent, public interest research group focusing largely on energy and environmental issues. We have been around here before, including before your predecessor the select committee, your predecessor's predecessor and perhaps your predecessor's predecessor's predecessor–I am not sure–following Ontario Hydro issues in many of their ramifications. I myself have spent more than 10 years working on nuclear issues for Energy Probe. In addition, we are regular interveners before the Ontario Energy Board, environmental assessment panels and consolidated hearings boards.

We will be alternating back and forth in working our way through from page 3 to page 1 of this presentation. To begin, I will turn the mike over to Mr. Poch for process issues.

Mr. Poch: I will not, strictly speaking, follow our outline, but it should give you a sense of where we are going. I think the first issue to discuss is just what we are discussing and who has been called upon to decide it.

In our view, decisions about electricity supply and demand are decisions about environmental protection, risk, job creation and industrial strategy. For example, how much do we want to pay a premium to reduce environmental impacts? Should we tilt in favour of efficiency and away from coal and nuclear to achieve that? How much do we want to pay extra to enhance flexibility? Are 3,500-megawatt, 14-year lead time nuclear plants flexible or reliable in this context?

Is it worth something to spread jobs around, and if so, how much? Should we go for efficiency measures in all sectors and locations instead of megaprojects that create local booms and busts? How much do we want to create temporary construction jobs, or would we prefer to foster a permanent, high-technology-oriented job sector?

The future, in our view, is not in engineering large and dirty coal plants. As we have seen, nobody wants to buy Candu reactors. We believe the future is in exporting smart lightbulbs and high-efficiency motor controllers. These are obviously important, wide-ranging questions, which bring us to the very first question. Whose decisions are these? In our view, they ar questions that are beyond Hydro's mandate They are social or political questions. They ar thus your questions and our questions.

But Hydro views the select committee a simply a consultation stepping-stone that it mus go through. As you are all well aware, there is n agency that has a formal mandate to routinel regulate Ontario Hydro. While the governmen can step in from time to time, if it so chooses, t force Hydro's hand, we note, for example, tha the government has not even formally responde in a full fashion to the previous committee' report.

Now, we are encouraged by the minister' remarks before this committee to the effect tha he is not happy with Hydro's numbers, but w have not seen anything concrete yet. We do know that the Power Corporation Act and the memorandum of understanding are being reformulated but they are being reformulated, to date, i secret, so we are not in a position to comment o those either. Some of you may be; I presume most of you are not.

All we can do in that regard is urge you t recommend enhanced accountability as a primary theme to be incorporated in those documents Rather than embark on a long presentation abou how we can attain accountability in variou ways, we will touch upon it from time to time The primary point I would like to make is simpl to invite you to revisit the recommendations o your predecessors, which were rather lengthy and thorough, and unfortunately are still floating about in an abyss somewhere.

We wish to be clear that our recommendations about accountability do not go simply to these social questions of trading off values, such as environmental quality versus cost; they also go to the narrower, more technical questions, such as low-growth projections and the availability and cost of demand and supply options.

1630

All of these assumptions have to be critically examined, and in all of them Hydro must not be allowed, in our view, to be the principal decision-maker and the sole entity with adequate resources to investigate options. In our view, Hydro's track record in demand forecasting is abysmal and its institutional bias is clear. I will give you just one example in case you have not been provided with many already. One of the previous select committee's recommendations, in 1986, recommendation 9, reads in part, "Ontario Hydro must be explicitly prohibited

from using the 'no-losers' test as a screening tool."

I do not know if I need to explain "no-losers' test" to this committee. Basically, Hydro's concern is that if it went after efficiency measures and gave incentives for efficiency measures which would be cheaper than the generation it might otherwise have to build, the customers who are not receiving the incentive will see a rate increase and that is somehow unfair, even though it agrees that the rate increase would be less in the long run than it would see from the generation that would otherwise have to be built.

They felt they could not offer such incentives and the previous committee very strongly told them: "Don't use that as a screening tool. You're not taking things from a broad enough perspective. Do look for mechanisms so that any apparent inequity is addressed. Hold back some of the savings you're generating for the particular customer and spread it around to everyone else, for example."

I was counsel for Energy Probe at the Ontario Energy Board hearings this summer and I thought I would investigate to see how Hydro was complying with that suggestion or was addressing that suggestion. What I found out is this: Hydro has been prepared to offer research assistance, financial incentives and rate structure incentives to assist customers to use more electricity when they are substituting that electricity for another fuel, if it is felt to be in that particular customer's interest.

They will do this even where it will add to average system costs and average customer costs, which is pretty well anywhere when we are talking about long-term additions of demand to the system. In other words, they will do this despite the fact that this expenditure does not meet a no-losers' test. When you go out and give someone an incentive to use more electricity and that is going to raise everyone's average cost in the long run because the next thing we do in this system is more expensive than average price, including Niagara Falls, you have not met the no-losers' test.

We are all going to pay for those additions. However, when it comes to demand-reduction incentives, Hydro takes a different view. They admit to reducing their targets for conservation efficiency, even though those targets are at cost-effective levels. In other words, if they can achieve 4,000 megawatts without increasing everybody's average cost more than they would by building, say, Darlington B, they say that is cost-effective but they are not going to go after 4,000 megawatts. The reason offered is, out of concern for what it would do to electricity rates. In other words, they are using a modified no-losers' test. We have this wonderful asymmetry; the only symmetry in the example is that in both cases all the customers lose.

Moreover, when asked if they would try to find ways around this apparent concern about rate increases, such as sharing the benefits or taking amortization periods for incentives that match the period when the benefits will be seen–in other words, charging the customers for this incentive, the customer group as a whole, over the same period this product being put in place will give benefits to this system–they felt it was not proper accounting because it was not their asset and they could not depreciate it over time. Of course, you are all aware that they do so with supply additions, for 40, 50 or 100 years. By that accounting approach, they load all the costs up front and it becomes much more easy for them to resist that expenditure.

We believe this double standard is probably the key problem and we believe you must not allow Hydro's inertia to continue to allow opportunities to be lost to us all. As the clock marches on, people go out and buy refrigerators that last for 10 or 20 years. We have lost that opportunity for that period of time.

We believe you ought not to let nuclear and fossil engineers at Hydro, as good as they may be in their field, decide what the environment is worth, for example. You should certainly question their views about the risks associated with the various options.

So, first of all with respect to process, we have three recommendations.

1. You reject the decision-making model that Hydro has proposed. These critical decisions about tradeoffs between cost, risk and the environment should not be Hydro's. They are properly ours; that is, the public's, the government's and yours.

2. As a continuing mechanism, in the hope that we will not all be back here in two years' time doing this once more, make Hydro accountable to an independent decision-making body to whom you have delegated sufficient authority.

It must conduct itself in an open forum where the public is welcome, I am sure you would all agree. Like the Ontario Energy Board, the Porter commission, the consolidated hearings boards–but unfortunately to some extent unlike this select committee from time to time–it must be able to see the value of spending thousands of dollars on good information it obtains from

independent consultants and that it obtains from all the sources available, and in spending those thousands, hopefully save billions in mistakes and worthless investments.

It must not put itself in the position of being solely reliant upon Hydro for cost impact and availability estimates. That was precisely the predicament your predecessors found themselves in when faced with the decision of whether or not to complete Darlington. They had no choice but to proceed because they had no good data set to make any other decision, in their view.

3. Finally, with respect to process, I would urge you to urge the government to respond promptly to your report, to get on with needed changes and to send Hydro a strong message before we are painted into a corner yet again by the passage of time. That is precisely, again, what happened with Darlington A.

What shall we do and how do we get on with the needed changes? That brings us to the choices to be made. I would like Norman Rubin to address them.

Mr. Rubin: Moving along to our second topic, the real choice in Energy Probe's view is not a choice among unpleasant supply options, which is the bottom line that Hydro works its way down to, basically coal versus nuclear and perhaps long transmission lines through multiple ridings. The real choice is between supply-side alternatives and demand alternatives.

It is a question of whether we are going to get serious enough about what Energy Probe and Hydro term the demand side. We both include parallel generation, self-generation and decentralized generation on the demand side of that equation. It is supply, but it is not centralized Hydro supply.

We are convinced that this is, in effect, the only question this committee need bother itself with; in other words, whether the demand-side options are attractive enough, numerous enough and cost-effective enough that the bottom line Hydro gets to–seeing an apparent need for more addition to centralized supply–is in fact only there because of the way it has handled or mishandled the demand side. We will be talking more about the way they do that.

I should point out, in fairness, that given the perspective I have of having watched Hydro professionally, in fact full-time for more than 10 years, it is fair to say that there has been some motion on the part of Hydro. We are not looking at the same Hydro we were looking at in 1978. Those of you who have been in this field for a while, even perhaps since the last select committee and certainly since the select committee before that, have noticed that Hydro does not take very long before it starts mentioning strategic conservation and independent power supplies. They used to take for ever before mentioning either of those.

The way I would like to put that change in perspective, because it would be wrong to deny it, is that I believe it would also be equally wrong to give Hydro credit for having entered the 1980s. I would put that in perspective by suggesting that the good news is that Hydro has entered the 1970s. They are moving in the direction. In fact, perhaps they have almost reached the point of 1978, when their colleagues south of the border were forced by federal legislation to knock down monopoly barriers on independent power generation.

I find myself again looking south of the border when I think of the new Hydro. I guess what it reminds me of most is the new Richard Nixon. We are perhaps a little better off than the new Richard Nixon.

1640

I think it is important that this committee look back at the recommendations of the 1986 select committee on energy, look at the recommendations of the Electricity Planning Technical Advisory Panel, look at the recommendations that have been made even as far back as 1980–the reports of the Royal Commission on Electric Power Planning and the reports of the 1980 select committee–which still have not been reflected in either government policy or in the new Ontario Hydro. Perhaps when those 1980 recommendations, if not the 1986 recommendations, have been translated into fact, then Ontario Hydro and Ontario government policy will have entered the 1980s.

In other words, there are still significant biases–the list the 1986 select committee analysed–towards centralized supply additions and away from all the alternatives to those supply additions. These take a number of forms, and David Poch will begin on that list.

Mr. Poch: I think I should start by summarizing what we view as Hydro's position. If I were to paraphrase Hydro and summarize Hydro's position, I would say this: Hydro agrees that conservation efficiency, co-generation and hydraulic are preferable to more central plants–by "hydraulic," I meant small hydraulic; by "central plants," I meant coal, nuclear or even imports–but it insists there is not enough out there to assure us that the lights will stay on. Therefore, they argue, they will do their damnedest on

conservation and efficiency, but we are still going to need more nuclear power plants–nuclear power plants because, in Hydro's view, they are the cheapest.

I think we cannot underestimate the importance of the last part of that; that is, the view of the price of nuclear power, because ultimately the thrust of Hydro's position that there just is not enough attainable and economically attractive conservation efficiency out there is based on its assumption of the cost of nuclear power. Once the cost of that conservation efficiency measure exceeds what Hydro says its nuclear plants cost, it does not look at those options.

We have to–and you have to–examine what Hydro's assumptions are with respect to nuclear costs. I know the government is looking at least at appointing a committee to do that in response to the EPTAP recommendation. You cannot underestimate the importance of that, because it is all too easy to accept Hydro's suggestion, "Gee, these conservation efficiency options are real great, but they just are not enough and we cannot slow this economy."

How much there is out there is a function of a lot of things, but first and foremost it is a function of how much you are willing to pay. The key limiting factor for Hydro on that is how much it says it can build a nuclear plant for. I thought we would just list a few points, with very brief comments, with respect to nuclear costing, and we will leave the bulk of the work for the committee we hope Mr. Wong will be striking shortly.

They tend to fall into two categories: internal costs, costs that Hydro sees or chooses not to see; and external costs, costs that Hydro passes on to others whether it admits it or not.

Dealing with the internal costs, we have provided a short list; for example, life expectancy and amortization period of the reactors. They choose 40 years. Obviously, if that period is too long compared to reality, you have been given a very false assumption about what nuclear power is going to cost on a per kilowatt basis.

You have heard from Dr. Hare. He is no foe of the nuclear industry. It was Dr. Hare back in the 1970s who said, "Let's get on with it and let's not worry about the waste problem for a while." But even Dr. Hare says he is very concerned about the pressure tube problem and he says, "Let's not put too many eggs in one basket."

I think it is quite reasonable that we ought to be taking a view that 40 years is excessive. For example, if we need to add more pressure tubes and there are only five or 10 years left in that 40-year period, given all the other expenditures at the end of a reactor's life, are we really going to do it? In the US we have seen a retreat from the 40-year period towards a 30- or even 25-year period in some cases.

With respect to annual and lifetime capacity factors, Hydro hopes to achieve 80 per cent on average over the years. We have already seen that they are having trouble achieving that even with relatively young reactors; again, any pressure tube problems or ageing reactors are just going to make that harder.

Discrepancies between ideal nuclear costs, the ones in your DSPS, and reality, Darlington: EPTAP notes this in its appendix C. I am wondering if, for example, in the DSPS, Hydro has included the addition of 1,160 new nuclear employees it has just told us it is going to hire in the next year or two.

Accounting for major upgrades in capital additions: Again, EPTAP makes note of this and cites the US experience of US$30 per kilowatt for capital additions over the life of reactors. Hydro generally underestimates this dramatically. If you take the US estimate that EPTAP offers, converted to Canadian dollars it is $144 million a year for 40 years or $5.7 billion in simple terms.

The costs of fuel disposal and decommissioning: Hydro incorporates, as anybody does when making projections of large project costs, a margin for contingencies. When they were about to retube Pickering A, they figured out what they thought it would cost and added 25 per cent as a reasonable allowance for contingencies; I think it came in around 20 per cent so far which was in fact used. Those were estimates made right at the beginning of the project. It was a task immediately in front of them, it was a contained task and so on.

When they look at decommissioning plants, it is going to happen at the earliest 50 years from now. No one has ever done it, and they are still only including a 25 per cent contingency. Their costs are typically below those projected by other utilities. They do not even include either for decommissioning or for fuel disposal the costs of acquiring a disposal site. That happened to come out this summer at the Ontario Energy Board. If they have missed such obvious points as that, I think their whole estimates have to be called into question.

There is the question of whether, when you go with nuclear plant estimates based on stations that are four-unit stations and you add another four-unit station, you affect your reserve requirement due to the large size of those stations.

Heavy water costs: Hydro, you may not be aware, takes its heavy water–which you probably are aware is about a quarter or fifth of the cost of nuclear plants–and depreciates it between now and the year 2040 as a class. Pickering B will be out of service in 2024; Darlington, if it lasts the 40 years Hydro hopes it will, will be out of service in 2032. Our grandchildren, who are not going to have those reactors, are going to be paying depreciation, are going to in effect be paying the capital cost of that heavy water. When you see TUEC, total unit energy costs, for nuclear plants including heavy water, they have stretched out the payment period for that heavy water well past the period when it is going to be guaranteed of providing us with any service whatsoever. There are all kinds of problems like that in Hydro's numbers.

Of course, pressure tube outages: They are assuming one or two years in their numbers before you; Pickering 2 and Pickering 1 took four or five years.

Health costs: I am going to leave health costs because that really falls into the next list, which is the costs that are not strictly speaking internal to Hydro but costs that are borne by others, externalized costs.

Mr. Rubin: We have listed on our outline five external costs which Ontario Hydro generally ignores or undercounts, generally omits in its planning.

The first of them is what we call business risk, and this applies most of all to either the decision to proceed with the nuclear generating station or the decision to view nuclear as an attractive option. In general, if one looks at the nuclear industry around the world, one finds that the nuclear industry is healthiest where the people whose money is being invested have least say in how the money is invested. That is, where businesses are expected to invest money in generating options, one cannot find any nuclear power plants being constructed; where governments, especially strong central governments like the USSR, Japan and Ontario, have the authority to spend or risk taxpayers' money with one central decision, there the nuclear industry is relatively happy.

1650

The reason for this is quite clear. As an investment, nuclear energy is a loser. The reason it is a loser as an investment has to do with the way people make investment decisions: the way all of us make investment decisions, the way the gentleman and lady from the Canadian Nuclear Association and Bob Franklin of Hydro make investment decisions. We look at the upside and the downside.

The upside on nuclear power, according to Ontario Hydro, is that we might be able to generate power perhaps 15 or 20 per cent more cheaply than the next most attractive option, maybe 30 per cent more cheaply. That is, to put it bluntly, a slow way to get rich.

The downside, on the other hand, is a list as long as your arm of ways you can lose everything in a day. Nuclear energy is one of the few assets that can turn into a liability of greater size than the asset in a day. That is what happened to Chernobyl. We are not talking about an asset vanishing. The government of the Ukraine would give its right arm to have Chernobyl and its impacts vanish.

Compare this to most bonds or stocks or other investments or new capital plant that businesses can invest in. If there is something that might vanish overnight, you are talking fly-by-night; you are talking about something that is an extremely speculative risk. It is very hard to find a factory, a new product line, a financial instrument that can turn into a debit greater than the size of the credit, but that is the reality of nuclear energy, it can do that; plus it can be rendered technologically obsolete, demand will not rise as forecasted, it has to pay for itself over very long times.

In other words, it has a downside that is virtually unlimited and a list of downside potentials which is very long. That is why you will search in vain for people voluntarily investing their own money to take those risks.

That term somehow has to be incorporated into the decision-making on nuclear power in Ontario. Somehow we have to include the business risk. There is a chapter in the Electricity Planning Technical Advisory Panel report on risk. They suggest ways of probablistically modelling the wisdom that goes into, for example, Mr. Franklin's own personal investment decisions. That is a wisdom, I would maintain, that is not being exercised in the decision as to whether Ontario should be investing, at its own risk, in more nuclear generating stations.

Mr. Poch: Perhaps the strongest piece of evidence of the fact that these risks are real is when you look at the risk of a catastrophic accident. Mr. Rubin has just talked about business risk. You do not have to have radiation spread across half of Ontario to have a loss of a reactor; all we have to find is that the pressure tubes just cannot be relied on and we have to shut them down tomorrow. But of course there is this

other element, the catastrophic accident risk, which we are all told is vanishingly small.

Some of us may believe that, but let me tell you the nuclear industry does not. They have something called the Nuclear Liability Act in Canada. It says that Westinghouse, GE, Babcock and Wilcox are not liable at all if something goes wrong. They lobbied very hard for that act. They have some more legislation wherever they do business, and they are fighting hard to keep it.

Ontario Hydro is liable only for the first $75 million, obviously a pittance compared to the costs we could incur in the event of a serious accident. That would not cover the lawyers' fees.

Mr. Rubin: Spoken by a lawyer.

Mr. Poch: Yes, I will admit that.

In the United States they have a similar law. Great pressure has just brought about a bill there which would raise the limit from what it was, $560 million, to about $6 billion or $7 billion. Here we are still at $75 million and everyone tells us there is no problem.

Why, if there is no risk of this catastrophe, does the industry fight so hard for legislated protection from that liability? Why are they not willing to put their own money where their mouth is? Why should you and I, and everybody who lives near Pickering, have to bear that risk, the financial risk, in addition to whatever risk we bear to our genes, to our lungs and what have you? I think that that speaks volumes, and it is, of course, a tremendous subsidy to nuclear power, in very simple terms, in the insurance costs they are not paying.

Mr. Rubin: When Mr. Poch said that the industry is spending a lot to keep the Nuclear Liability Act, he was referring to a legal constitutional challenge that we have under way in conjunction with 11 prominent Canadian individuals and the corporation of the city of Toronto to get the courts to declare that the Nuclear Liability Act is ultra vires.

Ontario Hydro has been the main spender of money on lawyers to make sure that its safety net stays there. That is either money thrown away because the Nuclear Liability Act is never going to do anything because there is not going to be a catastrophic accident and Hydro is too stupid to save the money or, as we believe, Hydro is too smart not to spend that money because it is probably worth every penny in order to be free of a risk that is real. You will have to decide on your own whether Hydro is too smart or too stupid to let us shoot down the Nuclear Liability Act. We give it credit for intelligence.

The third term on our list is what we call lack of diversity, and again it especially hits on nuclear investments, and it is what often is referred to as too many eggs in one basket. We are very dependent on nuclear energy now. We are becoming more dependent on nuclear energy, and, if Ontario Hydro does add even more to the nuclear capacity in the province, then we will be even more dependent.

While Mr. Poch is handing out one handout, I will just call your attention to a Globe and Mail article from April 9, 1988. You probably all saw it, an interview with Hydro chairman Robert Franklin, in which he says that 70 per cent is the maximum amount you would ever want to be dependent on any technology, whatever it is. I would love somebody to ask Mr. Franklin how he got the number 70 per cent. It is completely arbitrary, except that it is high enough to justify their expansion.

What you have in front of you is a mockup of a story that I hope we do not read in the Globe and Mail in 1997. You will notice that the date is in the future. We present this to you as a way of getting your attention late in the day, and also as a way of posing the following thought experiment to answer the question, "Where is the real threat to Ontario's electricity supply coming from?"

If this picture is a real one, in other words if it turns out, if somebody were to tell you now that he had looked in his crystal ball and we were going to have a serious problem of the lights going out 10, 11, 12, 15 or 20 years from now, ask yourselves: What do you think the text of these stories would be about? What caused the blackout that made the wheels grind to a halt in Ontario?

I would suggest that as you make that list of things that could bring the economy of Ontario to a standstill, the first 5 or 10 items on that list will all have the word Candu on it. There is no other threat to the security of our electricity supply that can hold a candle to having too many eggs in one basket. You have heard others refer to this. You have read the Electricity Planning Technical Advisory Panel report on the subject and you have heard Professor Hare on the subject.

You do not have to be a critic of nuclear power per se to think that we are risking too much when we become as vulnerable to a generic flaw in a new technology as we now are. Obviously, the select committee on energy in 1986 spoke of the dangers of "overreliance on one technology"–that is a quote–and that was one of the reasons it recommended that no new nuclear plants be built at present. We urge this committee to think

through what it is that might black out the province during the next 10 or 20 years and whether anything is half as likely as the discovery of a new problem with the Candu reactor that is generic to the design.

1700

Mr. Poch: I promised to come back to the question of health effects, because of course that is an externalized cost. This is one that Hydro especially shies away from discussing on the nuclear side. We have started to wake up to the health costs on the coal side, and they are not insignificant. If you look through the two binders of Hydro's presentation to you, which we received, it does not really mention health costs. It is as if there are no environmental and social costs of nuclear power.

On a previous occasion, when I was before your predecessor committee, rather than rely on some more controversial evidence, I simply took the United Nations data on the point. I have reproduced that again for you. It is in your handouts. It is a three-page set of numbers, and you do not have to follow it through.

Briefly, what we have done here is take risk estimates for radiation offered by five different bodies: three key bodies–the ICRP or International Commission on Radiological Protection, the United Nations agency and the National Academy of Sciences in the United States–and two other independent researchers whom you will no doubt have heard of–Dr. Gofman, who headed up the Lawrence Berkley lab for the United States and is now independent; and Dr. Bertell, who is a local radiation research expert.

We simply took the data from the very last page, where the UN calculates what the dose is due to reactor operation in the world. This is a very long-term view, I should add. It includes the exposures caused by the mill wastes and the mine tailings, again one of the predominant terms. We multiplied them together. We said, how much is Hydro doing, what does the UN say this costs in terms of exposure and what do these various agencies, including the UN, say that exposure will cause in terms of cancers and genetic damage?

The numbers are, as you can see once you start multiplying them by 40 years and so on, dramatic. We are talking tens, even hundreds of thousands or millions of health effects from routine operation. This is not from catastrophic accident. Do not pretend that just because the electricity coming out the wall looks clean and just because the nuclear plants do not have a smokestack, there is no very serious health toll involved. I am going to leave it there.

Mr. Rubin: I would like to speak of some of the environmental and health disadvantages of coal. Many of the factors that we have listed here as externalities are specific to nuclear power. We would not for a moment want to lead you to ignore the externalities, that is, the cost that society, victims and the environment must bear but Ontario Hydro and its customers do not bear. These are externalities, because if the generation of coal-fired power is killing lakes and you leave the lights on and your next-door neighbour does not, you do not have twice as many dead lakes as your next-door neighbour does; nor do you pay twice as much for dead lakes, because the cost of the dead lakes is not in your power bill.

The cost of the dead lakes goes up the smokestack, gets transformed into acid rain, lands on lakes downwind. We all use those lakes in some proportion or other. We use electricity in some other proportion or other. Some of us waste lots of electricity, kill lots of lakes, never go up to cottage country and never suffer from it; others the other way around. This is why this is an externality.

Energy Probe's position on these externalities has always been that they must be internalized; that is, the cost of the product must reflect the real costs, the real harm that the product is doing. In the case of coal-fired electricity, those costs are real and, to a great extent, can be measured. They include the cost of acid gas emissions, particulate emissions and carbon dioxide emissions.

The value of the cost of carbon dioxide emissions is still more preliminary in its science. Also, because of the global nature of the CO^2 threat, it is a little bit hard to do the math. We must do it; that is, ultimately we, as a society, are going to decide how hard we are willing to work to keep a tonne of carbon dioxide out of the atmosphere. It is our position that the way we should work that hard is, in fact, to tax, to internalize the cost of that harm.

As we have put down here, Ontario Hydro uses the factors of greenhouse effect, or carbon dioxide emission and acid rain, in the context of what is nice about nuclear. They do not usually mention that these are also advantages of parallel generation, small-scale hydro and efficiency. Smart lightbulbs and smart refrigerators avoid the greenhouse effect and acid gas emissions.

I believe it was Wolf Haefele, who is a nuclear official, who tried to scare people at The Changing Atmosphere conference by pointing out what a big impact on CO^2 emissions it would have if we stopped building nuclear plants. By

some point in the next century, I believe it was 2025, he generated something on the order of a five per cent increase in CO^2 emissions if we stopped building nuclear reactors.

It would be nice to save another five per cent, but I maintain that there are much less painful ways of affecting our CO^2 emissions over the next 20 years than continuing the expansion of nuclear energy. He is not a friend of mine. I am not presenting it because that is the nicest estimate I can find. I am presenting it because he is the most likely of anybody I know to come up with a high number.

Moving along to the next point, which we believe reinforces this bias that gets Hydro to its bottom line that it needs to build more plant, one of the factors you heard here is Ontario Hydro's attitude towards parallel generation. I refer you again to the Electricity Planning Technical Advisory Panel. This is one of the clearest sections in EPTAP's report. It made very specific recommendations, which we concur with, on how Ontario Hydro should open up its approach to parallel generation. We have the situation here where Ontario Hydro says, "We don't know how much parallel generation is available out there, but we are sure it's not enough, and we don't want to get all of it too soon."

Well, you put those three things together and your head could spin for a long time. I will repeat them: We do not know how much is out there because we have never really got serious about buying parallel-generated electricity; we know it is not enough, and therefore, we have to start building another megaproject, and we do not want to get the parallel generation that is out there too fast. As Hedley Palmer said to you, "We don't want to be up to our necks in alligators before we find out there is some problem with the way we are buying the stuff."

Sure, I do not want to be up to my neck in alligators or in the swamp. I have forgotten the exact phrase he used. It is in the material. I am not suggesting that anybody be up to his neck in alligators or swamps, but this is not a new field in other parts of the world. It is a new field in Ontario, but it is important that we start playing catch-up and not use our lateness as an excuse for slowness.

You have down on your sheet, our item 3 in this section, other asymmetries that tilt against conservation. You have heard one example. I think we have spent enough time on that already; for example, the asymmetrical application of the no-losers' test.

Let me just go on to the thought in the box on page 2. Ultimately, if we are to get the lowest risk and cheapest, best business ways of meeting supply and demand–making supply and demand meet for electricity in Ontario–economists will tell you that we can do that best with something like a level playing field. Let me just suggest one model for this where we might have a level playing field. I think you may find it opens your eyes. It certainly opened my eyes when I first heard of it or thought of it.

1710

What if Ontario Hydro simply bought all its power from parallel generators, if all power was treated as parallel generation? Ontario Hydro is now saying it will pay something on the order of four cents a kilowatt-hour for power. Can you imagine Darlington's fondest supporters convincing either themselves, or their friends with more money than themselves, to build Darlington or Darlington B on the basis that Ontario Hydro is asking other parallel generators to build cogeneration units, small-scale hydro plants, windfarms, wood-fired generation units? In other words, is there a consortium of people, banks, institutions, pension funds, anybody other than governments, in the world, that would think you could make money by building a nuclear plant and selling the power to Hydro at Hydro's rates?

I would maintain that this is almost a rhetorical question, the answer is so obvious. I am pretty sure there is nobody in the room, at least not in front of me, who would want to own even $1,000 or $10,000 worth of such an investment, again, because of the upsides and the downsides.

If this would not fly without the heroic support the nuclear option gets, how can we say it is economic if it would not compete on an equal footing? If people would be putting up small hydro dams, if they would be putting cogeneration units in their plants, if they would be building windfarms as they are in other places where monopoly abuse has been broken down, including many jurisdictions in the US, but would not be investing a nickel in nuclear power, not because they are anti-nuclear but just because they do not want to lose everything they own, then how can we say this is a good investment?

Recommendation 4 addresses some of the costs of what we have been discussing. The externalized social and environmental costs of both coal and nuclear, as well as the risk created by placing too many eggs in one basket, should militate against any commitment to further

centralized supply at this time and we recommend that this committee should so recommend.

If the committee does wish to rank supply options, including coal and nuclear and interprovincial purchases, it is extremely dangerous to do so until the successor to the EPTAP Candu costing study is available to give at least an independent view of what the real cost of nuclear power is. As far as we are concerned, again, the real issue is not the relative ranking of those two unattractive options but the harnessing of the potential of the demand side to solve our problem.

Finally, to our last section: cheap power at any cost? Question 1: when did we decide that electricity is more important to Ontario than food? I suspect to most of you electricity is important and food is important, but if you had to do without one for any duration of time you would prefer to do without electricity. I am pleased to report we do not have to do without either, but in our policies in Ontario and in general throughout Canada, in fairness, we artificially cheapen or subsidize electricity far more heroically than we artificially cheapen or subsidize food.

Let me list a few ways in which we do this. Perhaps as an eye-opener, I hope, imagine that the Ontario government had set up a crown corporation called Ontario Food. It can do so. It has not. It did set up a corporation called Ontario Hydro. Imagine that we took food supply as seriously as we take hydro supply. What might we do? We might give this centralized monopoly on food production tax-free status. We would not want to tax food. After all, food is essential. Cheap food would be good for voters, good for citizens, good for people. Nobody likes to pay too much for anything, including food.

We do not do that now. We tax farmers. We expect them to pay taxes; interesting. We do not expect Ontario Hydro to pay taxes.

This Ontario Food would be nonprofit, so our food bills would immediately go down by the amount of profit that farmers, shippers and supermarkets are now raking off our bread, milk and egg purchases. Not Ontario Hydro; instead of making a profit and passing it on as dividends to its owners, that is, all of us who own Ontario Hydro, we do not get one penny in dividends from Ontario Hydro. Instead, the users of electricity receive that dividend in proportion to their use; if you leave your lights on and your next door neighbour does not, in effect you are getting a bigger dividend cheque. Roughly two thirds of the total dividend in Ontario goes to institutions, industry, commercial users and o[n]
third goes to the people of Ontario directl[y]
because we use one third of the electrici[ty]
directly.

Ontario Food would be protected by provinci[al] loan guarantees from financial risk. It cou[ld] borrow to expand at a better rate than anybod[y]. Not farmers; they have to go to the bank, po[or] things. This would, of course, among oth[er] things distort our investments in food productio[n] and we would be unavoidably biased towar[d] capital-intensive overexpansion. Ontario Fo[od] would be protected from accidental risk as wel[l] so if a new food technology came along th[at] might, just might, wipe out southern Ontario [or] just cause tens of billions of dollars worth [of] property damage, Ontario Food and the farme[rs] of Ontario would not have to worry about [it] because we would have a special law that say[s] "It's not your fault."

As it is, we expect farmers to be bound by th[e] spills bill. I am glad we do. The equivalent woul[d] be making Ontario Hydro responsible for cat[a]strophic nuclear accidents. It refused.

We would allow Ontario Food, the foo[d] production technology, to build up long-live[d] toxins, poisons. It could just build up th[e] inventory of those wastes and taxpayers woul[d] spend to research solutions to that problem it ha[s] created. Of course, we would give it comple[te] monopoly status and control over the shipment [of] food from place to place just to make sure th[at] unauthorized producers do not get in witho[ut] clearance from the system.

Finally, we would give it the right [to] expropriate land, a right which Ontario Hydr[o] has and which our food production system doe[s] not have.

I hope I have indicated here just a bit of ho[w] heroic the effort is that we are making to ra[m] electricity down our economy's throat, to artif[i]cially cheapen the product by leaving out co[sts] and giving most-favourable-sector status to th[e] electricity production and use sector. When w[e] do this, we completely distort the investme[nt] pattern and we completely distort the use patter[n] and that is David Poch's job here.

Mr. Poch: Imagine if you were an indepe[n]dent farmer faced with that monolith, or if yo[u] are a consumer in Ontario faced with the choic[e] between using more electricity or investing in [a] smart lightbulb or if you are an industry face[d] with using more power or putting in place a ver[y] efficient cogeneration facility. All of thos[e] heroic efforts amount to competition you face. We would urge this committee to think abo[ut]

how meagre you can expect the response to be from conservation incentive programs or efficiency standard programs in light of that competition. You cannot come up fast enough with standards and incentives to capture all the ways we use power in this province. I defy you to find a good way to subsidize my deciding to turn the light off when I leave the room.

As long as we give all these subsidies to Ontario Hydro, my ordinary incentive to save a buck has been so diminished that I am unlikely to do so, and it is very hard for Hydro programs, ministry programs, standards, what have you, to address all the ways that my incentive to being rational with that resource has been completely eroded.

Similarly, I think it is even more so for potential cogenerators. Most industry that puts in place cogeneration does so to reduce–well, first, they have to use it to reduce what they are buying from Ontario Hydro. If Hydro's power is so subsidized, obviously the cogenerator is at a great disadvantage. We have a situation in Ontario where Hydro faces the option of putting in new supply. Let's say it costs six cents a kilowatt-hour, where the average price of power faced by industry is probably four cents a kilowatt-hour. A cogenerator might come in at five cents. The company which is faced with that choice asks, "Why should I build a five-cent cogenerator when I can have it for four, even though Hydro is going to have to spend six?"

1720

It is worse than that, of course, because we have all kinds of other little institutional tilts and declining block rates. In fact, the last block of power that industry buys is much less than four cents. If they have already hit their peak for the month and we are just talking energy costs as opposed to capacity costs, it is about 2 or 2.5 cents.

When we subsidize electricity, we are encouraging waste and we are making it harder for conservation and efficiency and privately owned power and renewables to compete. It would be much better if we did this with food. How much milk can we waste? How much milk can we drink? With electricity, it is pretty good how much you can waste, it is really dramatic in fact; but with food, there would be a limit to what we could waste. With food, what is the competition?

There is a question of social equity in all of this. When we subsidize electricity, I think as Norman Rubin has implied, there are all the ways we do it with favourable rates for borrowing, with no return on equity requirement; you may be hearing from Dr. Berkowitz, I understand, on that issue.

What we are doing is we are subsidizing electricity guzzlers, whether they be in industry or elsewhere. Indeed, what we are doing is we are subsidizing the rich over the poor, because of course the rich use more power and the rich consume more products from the industry that has that power subsidy. But we all bear the risk. We all bear the costs of those subsidies. We all bear the environmental costs. All our children will. We all forgo the profits we should receive as owners of Hydro, regardless of our wealth.

If we raised the price to reflect those subsidies, if we took away those subsidies or forced Hydro to pay a dividend to recognize them–to the government, to the people–we would all use less and the revenue created would more than offset the added burden faced by those who are in a difficult position to face it. I am thinking primarily of the poor residential customer. We could easily devise an income-tested energy tax credit which would shelter the people in that position from what might otherwise be a politically difficult move, in effect raising the price of electricity.

Our recommendation to you is that the committee recommend enabling legislation be passed that includes both the necessary amendments to the Power Corporation Act to withdraw these damaging subsidies and the tax credit provisions. That would provide relief from the hardship this could create for disadvantaged citizens.

We have also suggested that you adopt the recommendations of EPTAP. This is our recommendation 5, the preceding one. They make a number of very good recommendations in terms of assessing and obtaining the potential that is out there for cogeneration and for efficiency. They make a number of them specifically having to do with the price you offer and the method by which you obtain cogeneration and the rates you charge customers so that they get the right incentive in terms of power.

I think here they talked about moving towards long-term marginal cost; that is, you start to see, as an electricity consumer, what it is going to cost to build Darlington B if we have to, so you get the right price signal to conserve.

Mr. Rubin: Moving now to our last point under cheap power at any cost, one frequently hears Hydro spokespeople and Ministry of Energy spokespeople suggesting that a cheap source of electricity in Ontario is one of the few reasons we can afford anything; that is, we have

got where we have got by having cheap electricity and we have to keep low rates, even though this means we use too much and even though it means conservation programs have to make-believe a lot.

We end up saying: "What kind of lightbulbs would we be installing if we paid the real cost? Let's have a new Energy Efficiency Act that tries to get those lightbulbs into people's houses even though they do not pay very well when you are subsidizing electricity rates."

We are in the sort of situation we were in with oil federally when we were making believe that the price of oil was low and we had billboards telling people to ride bicycles. It did not work. When we finally bit the bullet, that worked, and in fact it worked much better than government and oil companies thought it would for those who were paying attention during the 1970s.

But what we hear is that we must not bite the bullet on electricity; we have to keep the price of electricity artificially low; we have to keep subsidizing electricity; we cannot internalize these environmental costs, the business risk costs; we cannot even have Ontario Hydro paying a dividend to its owners, the rich and poor of Ontario; it has to keep subsidizing electricity rates because that is the only way to generate wealth in this province.

Is it true? I have heard Ontario Hydro say that tens of times, dozens of times. I have never had them show me it is true. In fact, a few times they have shown me it is not true. They say, "Look around the world and see what a good job we are doing at cheap electricity and look at how much cheaper our rates are than West Germany or Japan," having said in the first part of the speech that the only way to be rich is with cheap electricity rates. I say: "Wait a second. Aren't West Germany and Japan doing all right?" I have never seen anybody just try to correlate these things. Are the winners in the world economy those who pay low electricity rates?

We have done a little preliminary research to this end. We have it on a slide and I think you may have the graphs in front of you as well. This is a point graph of gross domestic product per capita of about a dozen countries, plotted against the rates they paid for electricity. You do not see dots or Xs. In fact, the data point itself is in the dead centre of the country's name. This causes some problems when countries are close together on the graph, but I think they are all just barely legible, including the United States, Belgium and the Netherlands, which almost ended up on top of each other.

I am sure there is a computer prograr somewhere that could make a best-fit lin through this, but I would suggest that it would b about as fruitful as making a best-fit line throug the next cloud you see out the window. If you jus look at this as a point, you might think tha somebody had scattered names from across th room by throwing them. In short, it is nc clear–well, let me put that a little more strongly It is clear from this set of data points that there i no clear correlation between these two factors.

Turning to the next chart, this one is wealt generated per capita and the next one is recen change in wealth generation. This one is also pe capita. I did not put that on the top line. I did put i on the left-hand column, which is a challenge t read on the overhead but is clear on the paper This is the change in per capita gross domesti product of these countries in the period 1980 t 1985, as a percentage plotted against their recen electricity rates.

Again, as you will see, there are countries tha are growing fast and there are countries that ar growing slowly. Canada has low electricity rate and is growing more quickly than some nation and more slowly than others. Looking at the to line, if you just looked at Canada, the US an Japan, those growing fastest on that chart, yo would think that the higher the rates you paid fo electricity, the faster you were going to grow Looking toward the bottom, it is inconclusive.

The point is that we have been opposin paying the real cost for electricity in this provinc and we have been continuing to treat electricit as if it is more important than food, based, submit, on a myth, and the myth is that this is th way to be rich. Why should this be conclusive Why would you think that cheap electricit would make a country rich?

1730

First of all, the money has to come fron somewhere. Ontario has low electricity rates an high taxes. Surprise, surprise. If electricity user were paying tax and profits to the provincia purse in their electricity rates, we would not hav to have such high taxes. You put the sales tax u and people buy less. You put income tax up an people who are thinking of generating income g elsewhere or say, "Why should I bust my gut when my marginal tax return is so high that I an working for the government?" In other words there are impacts when you do these things. Wha we do is say, "Use all the electricity you want but your taxes will be high because tha electricity usage will not go into the public purse

s when we buy shoes or milk the tax on the profit oes into the public purse."

The other thing you do when you make lectricity artificially cheap is you encourage the rowth of the losers in your economy; that is, you ncourage the growth of the smokestack industies. If you look at who uses the most electricity produce a dollar's worth of goods, it is not the wift of foot in our economy. It is the losers in our conomy, those we think are not going to be so ealthy next year or next decade. In other words, is the 1950s and 1960s economy that is heavily ependent on electricity to put out a dollar's orth of goods.

It does not take much electricity to keep the ghts on and to keep the computers going while ou write computer software; it does not take uch electricity to send information from place place, and it does not take much electricity to in much of the service economy. It does take a t of electricity to extract resources and process em, the sorts of things we are trying to move way from towards the kind of economic mix that ill be a winner in the 1990s. Artificially cheap ectricity rates and artificially high taxes retard at move towards being swift of foot and being a inner in the next decade.

From a policy point of view, we would commend that you look hard at the suggestion om the Electricity Planning Technical Adviso- Panel to look at long-run marginal costing for ectricity. We would further suggest that envinmental and health impacts of all forms of ectricity generation be included. Otherwise, e are not only going to be retarding our onomy in the name of helping it, but we are so going to be creating policies that make the lutions to environmental protection and effiency harder to find rather than easier.

That concludes our presentations. We are here r questions. Thank you for your attention.

Mr. Chairman: Thank you very much, Mr. ubin. We have about 20 minutes left for estions.

Mr. Charlton: I have a couple of very brief estions. First, I will go back to the comments u made very early in your presentation, Mr. ch, where you were talking about the no-losers st. I am not sure if you are aware of it or not, but ydro told us, in what we thought was a very ear statement in early August, that as a result of r recommendation and the report two years ago d some serious thinking on its part over the ervening period, it had rejected the no-losers t in terms of demand-side options.

Now you, in your presentation, cited one example in this year's hearing before the Ontario Energy Board where that is not the case. They are still using the no-losers test. Are there other examples that you could provide to us of areas in which Hydro is still using the no-losers test?

Mr. Poch: In fact, the example I spoke of covered their whole program. They were giving a description of their global targets for conservation and efficiency as found in the demand/supply planning strategy, the several thousand megawatts, and they were saying that it was constrained. They gave a list of factors, and one of those factors was effect on rates. The number that they were reducing was a number they called "economic conservation efficiency"; that is, conservation efficiency that came in as cheap as their nuclear costing.

Mr. Charlton: Could you perhaps then just refer us to–

Mr. Poch: I have a copy of the relevant portion of the transcript, which I will leave. To be fair, they are not saying, "We won't go after that at all." They are just saying, "We won't go the whole way."

Mr. Charlton: No. I guess from our perspective, before these hearings end and when Hydro is back here, we would like to come to some kind of very clear understanding about what it was they told us earlier.

Mr. Poch: I should also say that I am only speaking for what they are doing in practice. I do not know what screening techniques they have used in the documentation that is before you and what they say they may achieve in the future. I am simply referring you to what is going on at the moment and what they reported under oath this summer. I have it with me and I will leave it with your researcher.

Mr. Rubin: If I could make just a brief comment, I do not recall offhand the section of the looseleaf presentation that they made where this issue comes up. I do recall the section of the DSPS primary document, the fat stapled one, where they discuss the 1986 recommendation of the no-losers test and they say, "We are not exactly adopting it." They say instead, "We think it is more appropriate to use a sort of social acceptability." That is, they substitute something else, which is a watered-down version of the no-losers test. I believe that presentation is consistent with the presentation that Mr. Poch extracted under cross-examination at the Ontario Energy Board.

I do not recall them saying anything different from that in the presentations here when Hydro was making presentations, but I was not here for all of it. It is possible it slipped by and maybe they have changed what they are doing but, if so, it is since this evidence.

Mr. Charlton: It was clearly our impression that they had, but we will have a look at the material and then we can obviously go back at them next week and get all of that clarified on the record.

I found your presentation very interesting from a number of perspectives that you have gone after that have not been presented to us before, but part of your presentation dealt with a number of items which have been suggested to us before. For example, last week we had a fairly lengthy and good presentation from Mr. Marcus. Have you had a chance to review that at all?

Mr. Rubin: I have not.

Mr. Poch: Neither have I. Sorry.

Mr. Charlton: It might be useful if you took the opportunity to review that and perhaps in a further written submission just commented to us about how that fits in with some of the things you are saying here. In effect, I think there are a number of things you are saying here, which directly relate to or overlap with things that were said to us last week, but you are using different terminologies in many places. I would just like to clarify some of that, but it is difficult if you have not reviewed his presentations.

Mr. Rubin: I would certainly expect the direction of our presentations to overlap. If there are any specifics where you could give us his terminology and see if we recognize it while standing on one foot, we might well do so if you can do that now. If there is anything where you wondered–

Mr. Charlton: I do not have his presentation here with me. It is back up in my office.

Mr. Rubin: As I say, I would not be surprised if we were coming at the same point.

Mr. Charlton: Perhaps we can arrange to do that at some point.

Mrs. Grier: In regard to the process question of how power planning is done–and you have reminded me that I should review the Porter commission and its recommendations, which I am not familiar with–are you familiar with the figure that was included in what you are calling the EPTAP?

Mr. Rubin: What page? Are you talking about Specific Steps of Power System Planning?

Mrs. Grier: Yes.

Mr. Rubin: There is a question of what page i is on, but we have it.

Mrs. Grier: There is no page number.

Mr. Rubin: Right.

Mrs. Grier: I would be very interested in you comments on that and whether–as you may b aware, that committee talked about the lack o clarity between strategy and policy in Hydro' DSPS–I would be interested to know whethe you feel that model has some merit and how yo see your concern about more openness fittin into that kind of model.

Mr. Poch: I have several comments, whic you have prompted. First of all, whatever mode you pick, I think there is merit in having technique which lets the public in, which lets i the diversity of opinion, the different use groups, the different affected groups, the differ ent experts out there, because experts disagree.

What I fear most of all is any model whic leads one entity holding the reins with all th resources and all the research capability un checked. Be it Ontario Hydro, be it an energ czar who gets appointed. Openness is obviousl something we value.

The figure you refer to there, figure 2, it seem to me, simply points out a logic path. You star by analysing the existing and the options befor picking your preferred, which would seem t recommend itself. I guess some of us doub whether that is going on.

1740

Mrs. Grier: Do you see the public participa tion in that analysis and in that choice of option as occurring, with muscle, before something lik the Ontario Energy Board?

Mr. Poch: That is certainly one good option if it had the muscle. However, you cannot expec a regulatory board, for example, to be responsi ble for rates unless it has some capability to loo at system expansion; otherwise it gets painte into a corner. Half measures can be dangerous t some extent, but I would also caution, if an power is to be invested in, for example, th Ontario Energy Board, that care be taken agai that the process be very open.

One thought comes to mind. At the moment Ontario Hydro is, I think, somewhat confused o this whole question of which comes first. Th example that comes to mind is that of the acid ga scrubber program. They are moving towards a environmental assessment which will give them from plain reading of the document, permissio to go ahead with anywhere from zero or one up t

alf a dozen or eight scrubbers as demand equires them to meet the regulatory limit. Those crubbers are very expensive, as is the refitting of ie coal plants to extend their lives to make it ogical to invest in scrubbers in them.

They are doing so before we have any results om the DSPS/DSOS process. I am sort of artled. I do not know what to do, as a lawyer dvising an environmental group. How can you ogically go and say, "Yes, carte blanche," or Yes, two scrubbers or four scrubbers," until you ave had a comparison of coal with scrubbers ersus efficiency, for example?

I just fear that this is another example of being ainted into a corner. They will get their pproval, they will go out and invest all this ioney in coal scrubbers and then, of course, it is crime not to use all that investment, despite the irbon dioxide, which you cannot scrub efficiently. I think we have a way to go before we ave a logical decision-making process.

Another example related to that one is that ydro is currently undergoing, or is about to nbark on, an environmental assessment of ore transmission lines from the London region wards the Windsor-Sarnia area. They will be stified on a number of grounds; for example, ipply to the Windsor-Sarnia area. Of course, in ipply to the Windsor-Sarnia area, the competion there is cogeneration. That is the hotbed of generation in Ontario. We have Dow Chemi-l with 300 megawatts, for example. How can e assess the need for that transmission line in e absence of the basis for comparison that the SPS is supposed to offer us between cogenera-on and centralized supply and transmission stems?

Similarly, that transmission line will be ggested as important for ties with New York ate and Michigan. Again, nothing is being done an even footing. Of course, why are we not oking at the need for scrubbers versus cogenetion in Windsor, taking the transmission lines d the additional cost for the scrubbers as one tion versus cogeneration in Windsor? It is not ing dealt with in the same forum. It is not being alt with on an even footing. Of course, it is ways a problem; when you start in, things are lfway through.

Hydro has been using that excuse. They have oided environmental assessment on every clear plant so far on that excuse. They have oided it recently on the tritium plant too. We ve to start saying at some point: "Hold on. t's do everything in a consistent fashion, in a way that we can get all of the costs counted and compared."

Mr. Rubin: If I can just add, certainly my favourite and, I think, Energy Probe's favourite way to count these things consistently is in fact to make them all costs.

In other words, now we are expecting Ontario Hydro to say: "Wait a second. If we encourage people to cogenerate with gas in the Windsor-Sarnia area, that eliminates the sulphur emissions and it also eliminates the need for a transmission line. That increases the value of that cogeneration and, therefore, we should be paying more. We will internalize that all, even though it is not something we do; that is, it means less demand for the things that our staff and our planners do for a living, which is build plants and build transmission lines."

That is tough. It is very hard to expect an institution to do things for long that are not in its best interest. It is really expecting sainthood out of the people whose job it is to provide our electricity. We are structuralists. We think that if you expect sainthood from people in order for a system to work, you are cruising for a bruising. You may find some saints in Ontario Hydro–I am sure there are some–but to expect that entire organization to act as if it were a candidate for canonization I think is a dangerous mistake. We need a structural solution.

One way to do that is to include the costs as costs, and then the right answers tend to be the cheapest answers. As long as sulphur emissions are free, there is no credit for abating them. Hydro follows the law. If you threaten to throw them in jail if they go over a certain number, they will be below that number, but underneath that number it is business as usual. They often argue at the Ontario Energy Board that they have no right to be too far below the number because it would raise costs and that is what the Power Corporation Act says they must not do.

So trying to turn things into numbers so we can have public input on what the values are to those numbers I think could be a very fruitful exercise.

Mr. Poch: Perhaps one thing that deserves a separate circle or box in this schematic you pointed out to us is a costing of those externalities and an inclusion of those externalities, and that has to be at the very top so that all the comparisons below are on an even footing.

Mrs. Grier: You mentioned the capacity factors of nuclear as being an internal cost that is not adequately dealt with. Yet we have had today in the submission just before you from the Canadian Nuclear Association the top 10 lifetime

world power reactor performance, which certainly is at variance with the comments you made.

Mr. Rubin: No, it is not at variance. In fact, our comments are also echoed, or vice versa, in the EPTAP report. If Ontario Hydro is forecasting performance from its nuclear plants that is better than they are going to run and that is in fact better than they have been running, it gives us no solace that other nuclear plants elsewhere are running worse.

Mrs. Grier: But 90 per cent capacity at Pickering 7 is pretty good capacity.

Mr. Rubin: Right, Pickering 7–

Mr. Poch: You need to average in Pickering 1 and 2, obviously.

Mr. Rubin: The bottom of the chart is ours too; that is, there are not many reactors around the world that have had zero annual capacity factor for four or five years in a row, but Pickering 1 and 2 did. So you have to average it all in; you have to see how the performance is. This is not to denigrate the people who design them or the people who run them or fix them. It is just a question of what is a reasonable–you know, what is the coupon on the bond? What is it really going to pay? One of the bottom lines for that is what percentage of the time it is going to be running.

If you were investing the money or if I were investing the money, we would say: "Wait a second. We're investing here in plants that have to perform for 40 years. Show me the performance record of the 30-year-old plants." The answer is: "Actually, we are waiting to have a 30-year-old plant. We have one that is 17 years old but it is shut down for ever. We have some others that hit their 15th birthday and had to be shut down for four or five years, but it is going to be a lot better later." That is what the prospectus says.

How much do you want to invest in that? I want to head for the hills. I want to find another financial adviser if I hear that kind of advice, unless it is paying a 30 per cent dividend and then we will talk. This does not pay a 30 per cent dividend. This pays blue chip earnings on speculative fly-by-night risk. That is why you cannot find business, why you cannot find people with money to invest in it.

Mr. McGuigan: I have to find myself in a very confused state having listened to this very scholarly presentation, because I look at Energy Probe as pretty much a left-wing organization and yet I hear you making extremely right-wing arguments. I look at the history of Canada: it has prospered because we lost money on the ra roads, lost money on grain handling, we lo money on the seaway and we lose money about everything we do, but out of that–

1750

Mr. Poch: We make it up in volume.

Mr. McGuigan: Like the farmers, we make up in volume. But out of that we have one of t best societies, I think, in the world. If you lo across at the election going on in the Unit States right now, they are arguing about who c wave the most flags, who is the most patrio and who can call each other by the worst name Beyond liar, thief and everything else, above a the worst thing to call each other is liberal. That the worst thing of all.

I compare ourselves with them, and yet y condemn Ontario Hydro for the policies that w result in–we visited the mines last wint looking at health and safety because mi accidents are spectacular and there is a lot interest in them, yet the record is very good. Y go down into the mines and see the reason for th is that you have very few people working in t mines underground; the numbers are small. Ev the unions agreed to the reductions in numbe reluctantly agreed, but they agreed so that t industry would survive. They had to go to mu smaller numbers.

The miners on average make $45,000 a ye and individuals up to $80,000 a year. They do because we have plentiful and cheap hydr Wherever you look, they are being powered hydro instead of by manpower. There a benefits that come out of that in terms of hum benefits to the people involved, and also profi They are taxed, and the income taxes come o those salaries, and so on.

I sometimes have to think that what I hear fro you is a bit of scholarly nonsense; that it mak great arguments, but it does not meet the realiti of Canada or of Ontario. We are a supplier natural resources and the Shield is unique Canada; perhaps Sweden and other countri have parts of the Shield, but we do have t Shield here in Canada, a great storehouse minerals and we have the huge forest area that 10 per cent of the economic activity of Ontario

We cannot turn our backs on that and simp say, "We are going to go to the uses that w withstand expensive hydro, such as turning c software." Sure, it is great to add to our arsen but in Ontario we still have to rely upon the bas industries if we are going to utilize the manpow and resources of Ontario.

I find your presentation has kind of a religious ature. I am kind of a religious person myself ut–

Mr. Poch: But here you are using it as a bad vord.

Mr. McGuigan: Yes, I am using it as a bad vord, because I do not see the good that comes ut of it. Anyway, I have got that off my chest nd I just wanted to leave that with you.

Mr. Poch: Let me respond very briefly, and I m sure my colleague will have some thoughts o. First and foremost, what we are saying is, why subsidize things that destroy the environ-ment? This is what Madam Brundtland said. nergy use from centralized forms is one of the ost destructive things we do, and what upsets s so much as environmentalists is that this is one f the things we subsidize most in this province.

We are saying that if you want to go about ubsidizing regional development, mines, what ave you, even though they are energy intensive, o not do it by giving them cheap energy, by iving them every incentive to be wasteful with hat input.

Give them money. That is what you, as gislators, should do. Decide, for example: "We on't want to see this one-company town close own. We'll bail out that company. We'll bail ut that town." Give them money and give them e real price of electricity, so when they go to uy their motor they will still have the incentive use an efficient motor, but they will have the ubsidy in cash so they can survive. To me, you an have your cake and eat it too.

Mr. Rubin: This is a distinction we call the istinction between subsidizing people and sub-dizing resource use. When you subsidize source use, you always do environmental harm nd you always deplete the resource faster than e economics would dictate. That is not good for ur great-grandchildren. It is not good to dig up e rocks as fast as we can and ship them off in ains. That does not really provide sustainable evelopment. It is true that is how we built up our 950s economy; you are right about that.

It is also true that Canada has established its lentity by creating infrastructures. The railroad, think, is the best example. I am not suggesting at investments of that kind pass the same ost-benefit analysis everything else does or that e not have a railroad that runs east-west until e private sector is willing to build us one. There e parts of nation-building and province-uilding where you create an infrastructure that hanges the shape of your reality. If you are lucky, you do it once, like Niagara Falls. We are not discussing that.

We started building an electricity grid here a long time ago. We have decided we are going to have a grid. Now the question is, are we going to have Darlington B? I would maintain that is not going to do much for the provincial identity. We are not all going to hold our heads higher as Ontarians–as we do hold our heads higher as Canadians because there is a transcontinental railway–because there is a Darlington B. I do not think it is that kind of investment in identity.

This is, or should be I think, a question of how best to make supply and demand meet while wasting as little money as possible. The question is, can you do it with smart lightbulbs and smart refrigerators–smarter, better, faster, cheaper–and develop more industries domestically that are actually going to provide more jobs and more export potential than the Candu industry? Our evidence says yes.

If you are saying this is how we got to the 1950s and that is charting our course for the future, good luck, but please do not do it with my tax dollars.

The other point is that I think I heard you suggest that the reason Japan is so good at electronics is that they do not have the Canadian Shield. In effect, I think that is where your religion takes you, that we have the Shield, therefore we have to be hewers of wood and drawers of water because we have the wood and water.

I would maintain that is not a shortcut to prosperity. In fact, I do not know if you have noticed the way the sectoral mix in our economy is changing. We are moving away from the 1950s; we are just doing it too slowly. We are doing it too slowly because we have the brakes on; we have the brakes on in policy areas, one of the biggest of which is that Ontario Hydro's pricing policy–let me retract that statement: It is not Ontario Hydro's policy, really; it is the Power Corporation Act policy that tells Ontario Hydro how to do it. Ontario Hydro likes it too; it increases its market share. That policy tends to take money from winners and give it to losers and tends to put the brakes on the change which is going on in our economy.

Mr. McGuigan: I certainly admit there are changes going on, but I would not like to say to that $45,000 per year miner that he should go put on a pair of magnifying glasses and work on chips for $10,000 or $12,000 per year.

Mr. Rubin: Or the other way around, I hope you are not suggesting that people who would

like to write software go down the mines, because they are not going to take it well, either.

Mr. McGuigan: No, I am not. But I do not take the opportunity away from the one group when the opportunities are still there for the other people if they can work just as well on cheap hydro making their chips.

Mr. Rubin: If the hydro is really cheap, fine. If it is not really cheap, if it just looks cheap because we are foregoing taxes and subsidizing the risk, if we are just making believe it is cheap, which is what I would maintain we are doing, then they are not running an extraction economy with cheap electricity. They are running it with my tax dollars because I have to make up the taxes the major power consumers of Ontario are not paying on electricity and Ontario Hydro is not paying on the profits it does not make. In other words, I am being told that I am really not a part owner of Ontario Hydro; the major power consumers of Ontario really own Ontario Hydro. They get the dividends.

1800

Mr. Poch: When we choose to subsidize mining with electricity rather than with cash, we are choosing to subsidize it with the depletion of environmental quality that electricity inevitably means rather than simply by saying, "We value that part of our economy and we want to make sure it survives this five-year low in the cost of nickel or whatever it may be, and we're just simply going to move some of our economic output behind that industry."

In my view, that would be a legitimate decision from a Legislature. What I do not like is when we subsidize that kind of industry across the board by giving it cheap power, cheap because we do not count risk and we do not count environmental impact. That is what I find sort of regressive.

With respect to your left-right comment, Energy Probe tends to view itself on a different axis; maybe centralized-decentralized would be more like it. One of the effects of subsidizing electricity is that we are subsidizing the rich, inevitably.

Mr. McGuigan: Having some experience in agriculture, which is highly subsidized, I would disagree with your analysis. Canadian agriculture subsidizes a net income to the point of 65 per cent and that income is now from government subsidies. As I am involved in struggling with those things, I can tell you it is not easy.

There are many cases you can make that we are subsidizing the rich farmer. In fact, it is very easy to make the case that we are subsidizing the ri farmer. I think often the easier and simpler way through the input rather than through cash. I not think you can really make the case that ca payment is the simplest–

Mr. Rubin: Let me give you an examp Perhaps it will change your mind or perhaps will be the basis for future discussion on t subject.

One of the big costs of mining, for example, living where the mines are and working whe the mines are. They tend to be in the far north believe that just as there was a policy and identi purpose for government to build the railroa there probably is a consensus in Ontario that it important for us to be in our north.

If you subsidize people for living in the nor of the province as opposed to subsidizing t electricity they use to heat their houses and r their mines, you will be giving money to mine and to mining companies that will make it easi for them to do what we as a society want the to do.

But if you ask your constituents, "Do we as society want people to be inefficient in electi city, and do we want to use more of this aci rain-causing, nuclear-waste-causing stuff' they will tell you environment comes first as f as they are concerned and you are going in tl wrong direction. They may also say, "We wa to subsidize people to inhabit and be producti in our north, but don't do it by encouragir them to waste electricity." Why do we wa northerners with badly insulated homes? That the effect of cheap electricity in the north. W should be giving northerners money for bein northerners because the cost of living is higher u there and we do not want them all to move t Toronto.

Mr. McGuigan: Really, the point we a talking about is a question of whether you believ in doing it entirely through the economic syster or whether you believe in doing it through th regulatory system. As an environmentalist, I a as concerned about these things as you are.

Last week, we came from Elliot Lake, whic is a new town. The houses in Elliot Lake a probably the best insulated houses in Nort America. That was not done because they ha expensive electricity. It was done as a matter c policy by the company that was involved. I thin we can have policies which are not necessaril driven by dollars.

Mr. Rubin: As I say, look at what happene when the Organization of Petroleum Exportin Countries raised its price for oil and what brough

s efficient cars. I think if you look at that xperience of what the Canadian government as doing to make us oil self-sufficient and how e really became oil self-sufficient behind our acks, as it were, as far as I am concerned that is e most instructive example in that. It says that olicies are nice, billboards are nice and energy olicies are nice, but if you artificially cheapen mething, if you tell people to work $40 hard to ve a $20-barrel of oil, they are going to look at ou funny; and if you expect them to work almost 40 per barrel hard to save one $40 barrel of oil, ey will do it.

Mr. Chairman: I wonder if I could interject re, Mr. McGuigan. We are running late.

Mr. McGuigan: May I make one final point?

Mr. Chairman: Certainly.

Mr. McGuigan: I have made the same gument and I agree with what you are saying, t you have to remember that that was imposed on us by the oil sheikhs and we were not able to te or–

Mr. Rubin: That is not true. We had a made-in-Canada price that made believe the oil sheikhs were not charging us that. We took it out of our tax money, a couple of billion dollars per year in an equalization fund to make imported oil cost the made-in-Canada price. You remember that. We did that.

Mr. McGuigan: It had already begun, though–

Mr. Rubin: Well, the OPEC price was certainly OPEC's making.

Mr. Chairman: Thank you, Mr. McGuigan. Mr. Rubin, I would like to thank you for coming in and discussing with us. I think the fact we have gone a little late is an indication of how interesting the discussion was. Thank you again for coming in.

Mr. Rubin: Thank you all.

Mr. Chairman: I will adjourn the committee until ten o'clock tomorrow.

The committee adjourned at 5:06 p.m.

CONTENTS

Monday, September 26, 1988

SELECT COMMITTEE ON ENERGY

Chairman: Carrothers, Douglas A. (Oakville South L)
Vice-Chairman: McGuigan, James F. (Essex-Kent L)
Brown, Michael A. (Algoma-Manitoulin L)
Charlton, Brian A. (Hamilton Mountain NDP)
Cureatz, Sam L. (Durham East PC)
Grier, Ruth A. (Etobicoke-Lakeshore NDP)
Matrundola, Gino (Willowdale L)
Ray, Michael C. (Windsor-Walkerville L)
Runciman, Robert W. (Leeds-Grenville PC)
South, Larry (Frontenac-Addington L)
Sullivan, Barbara (Halton Centre L)

Substitutions:
Beer, Charles (York North L) for Mr. Brown

Clerk: Manikel, Tannis

Staff:
Argue, David, Consultant; with Passmore Associates International
Richmond, J. M., Research Officer, Legislative Research Service

Witnesses:

Individual Presentation:
Ullsten, Ola, Swedish Ambassador to Canada

From the Canadian Nuclear Association:
Runnalls, Dr. O. John C., Chairman; Chairman, Centre for Nuclear Engineering, University of Toronto
Dionne-Marsolais, Rita, Vice-President, Information
Wilson, Ian, Vice-President, Technology

From the Energy Probe Research Foundation:
Rubin, Norman, Director, Nuclear Research
Poch, David I., Legal Counsel and Researcher

Ontario

No. N-21

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy

Electricity Demand and Supply

First Session, 34th Parliament

Tuesday, September 27, 1988

Speaker: Honourable Hugh A. Edighoffer

Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the ba together with a list of the members of the committee and other members and witnesses tak part.

Reference to a cumulative index of previous issues can be obtained by calling Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Servi Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toron M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Tuesday, September 27, 1988

The committee met at 10:09 a.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY
(continued)

Mr. Chairman: Our first witness this morn- is Mayor Lyall Smith from Deep River, in the inty of Renfrew. Mayor Smith, perhaps I will t turn the meeting over to you. We have about f an hour for a presentation and discussions.

TOWN OF DEEP RIVER AND
COUNTY OF RENFREW

Mayor Smith: If I could, before I begin, I uld like to note a comment and perhaps ask a stion of the chairman. We from the county of nfrew and particularly from the town of Deep 'er and the delegations that will follow this rning have noted that we have received one f-hour of your very important time, and we y much appreciate that time. However, we do e that most participants have had in the order an hour to make their presentations. We just e that. We do not understand it, quite frankly, we note it, given the fact we are the birthplace one particular component of energy in tario.

The other question I would like to ask is, I lerstand some of these committee hearings are camera. One of them is Ontario Hydro with ard to power purchasing, and I understand it is sonable to do that sort of thing in camera. But y are the hearings with Mr. Passmore and Mr. gue being held in camera?

Mr. Chairman: They are the consultants who e been retained by the committee, and in er to allow them to go over–basically, the ole report will be written in camera, it will not written in public session, and that session next ursday, I guess it is, is effectively the first sion of this committee when we will start ting the report. It is in camera so that we can cuss and review what has been said, and they the consultants who have been retained by the mmittee.

Mayor Smith: Could you give me an idea of r background, sir?

Mr. Chairman: Passmore Associates Inter- onal is an energy consultant firm in Ottawa has been retained by the committee.

Mayor Smith: Okay. Thank you.

If I may begin, first of all, I would like to say good morning and to note that the town of Deep River is honoured to be able to present its views to the select committee on energy as part of the committee's review of Ontario Hydro's draft demand/supply planning strategy.

This is the third time we have appeared before this committee since 1979. In that year we spoke to you in response to criticism of Ontario Hydro's nuclear power demonstration facility at nearby Rolphton, a facility now closed and being decommissioned. In 1985 we came a second time to discuss the completion of Darlington. Today, of course, we are here with regard to this very important planning strategy document.

The honourable members present are doubtless aware of who we are and who is the major employer in our area. Not all who live in Renfrew county, Ontario's largest county, work in the nuclear industry. However, we can say with confidence that given the history of nuclear research and development in our area over the past 45 years, most people from out our way are familiar with nuclear-related matters and are proud of the accomplishments of those who work in this field.

We awaited this report with great anticipation and reviewed it with correspondingly great interest. For the most part, we believe the authors have presented the facts in a reasonable fashion. If there is a major criticism of the report, it is that the policy direction is left vague and uncertain, as if to say, "Some of my friends are for this, some of my friends are against it, and I'm all for my friends." In that regard, as friends of Ontario Hydro, we suggest consideration of the following points as the basis for definitive long-term plans.

We all agree that in the years to come Ontario Hydro will need a variety of electrical generation technologies, as has always been the case in the past. Which type of technology will be expanded and in what area should be a decision based not only on technical considerations but also on consideration of social and economic factors.

We emphasize that there should not be a uniform policy adopted for all areas of Ontario. What works in eastern and northern Ontario may not work in the urban south, and vice versa. We

have no shortage of historical lessons to this effect, many of which I am sure are within the members' personal experiences.

Demand management programs should not be imposed by Ontario Hydro on either local utilities or its direct customers. Such programs should be a local option, undertaken where they make sense, as in the case of our own municipality.

Let me explain. Deep River Hydro has installed the first FM radio-controlled load management system in Ontario. This system, funded by the local utility with some small financial assistance from Ontario Hydro, has been implemented simply because the electrical power we supply to our customers is the most expensive municipal electricity in eastern Ontario.

There is an appendix there for you to look at. More than 56 per cent of our municipality's total heating load is supplied by electricity. That significant electrical load is residential, commercial and retail, with no offsetting industrial. The resulting load factor is very poor, and something had to be done to improve it.

With the load management system, we hope that this winter we will able to cut our peak load of 15 megawatts to a reduced peak of 13.5 to 14 megawatts, simply by turning off major electrical loads for 15-minute intervals–I should explain during the utility peak–with no noticeable impact on our customers. For their help in improving our load factor, our participating customers will share financially in the saving that will result from reduced peak demand.

We bring this matter to the attention of the select committee to demonstrate that, given some small encouragement, local utilities can make improvements on the demand side of electrical needs without creating significant social change or impacting severely on the customers' lifestyle.

In the area of demand management, generally, our fear is that if those who advocate government-imposed energy efficiency standards are taken seriously, the resulting backlash may well obliterate what is initially intended. In short, we recommend less government intervention in this area. What was accomplished in the late 1950s, as some of you in this room will remember, is not likely achievable today without incurring unacceptable costs.

We understand that Hydro's mandate is relatively simple. It does not include purchasing significant electrical power from outside Ontario. It is to produce electrical power in Ontario for the people of Ontario at the least cost, w due regard for the environment.

Purchasing large amounts of electrical po from Manitoba and Quebec is effectively exp ing jobs to those provinces. This past summ because of low water levels in Manitoba, found ourselves without sufficient power fr our traditional peak load suppliers. This exp ence should have taught us that to have industries dependent on someone else, desp the best intentions, is hardly a good policy.

Wind and solar energy, although no do technologies that will improve, are not practi for Ontario simply because of the weather. are not California. The technology to st electrical energy for days and weeks at a ti crumbles when faced with eight months of win and four months of poor snowmobiling.

Given the limited amount of time afforded present this municipality's brief and given tha is easy to criticize but more difficult to ma helpful suggestions, we have attached appe dices B, C, D and E to this presentation, as w as a resolution and related correspondence whi we ask you to consider. Before dealing with th however, we would like to provide you w some background which will show you why t is one supply option that should be seriou considered, and soon.

Everyone concerned recognizes that the we being of all Ontario is dependent on a safe, clea affordable and adequate supply of Ontari produced electrical energy. To date, in its years or so of existence, Hydro has more th fulfilled its mandate to the people of Ontario produce power safely and efficiently. Howeve we have for some time had serious misgivin about claims that Ontario has a sufficie electrical surplus for the foreseeable future.

As mentioned, alternative technologies are n yet sufficiently developed to make a substanti contribution. Gains made through conservati are difficult to predict with any accuracy. Ne hydraulic sites, other than Sir Adam Beck 3, a difficult to find and develop. In most cases th are extremely remote from the market, th imposing the additional cost of constructi transmission facilities. The public resistance the environmental impact of such generation a transmission projects is a cause for concern.

The report also suggests that large fossil fu plants would be part of the supply option f Ontario, even though Ontario has no significa deposits of low-sulphur coal and must import th fuel. More important, notwithstanding the use scrubbers, which we understand alone wou

ost the equivalent of a complete nuclear power ›actor–just the scrubbers themselves, not the oal unit–these facilities create acid rain, an nvironmental obscenity, of which we in the)ttawa Valley and eastern Canada bear the runt.

Furthermore, coal-burning creates waste in the orm of ash at a rate of something like one ton for very four tons of fuel consumed. This ash is not nly voluminous, but is also laced with cadmium nd lead which are both extremely soluble in vater and poisonous if allowed into our water upplies. Ontario does not need a new waste ianagement problem of this magnitude.

Finally, if we consider Ontario's responsibili- y to planet earth, it is irresponsible for us to ontemplate adding to the staggering burden of reenhouse gases like carbon dioxide now being umped into the atmosphere. Enough has been vritten and said about this point recently to onvince us that Ontario and Hydro should in fact e moving towards the elimination of large-scale ossil power generation.

In short, to suggest that more coal-fired tations are even being considered is evidence iat Hydro may be avoiding the nuclear option, 1 an attempt to respond to today's political ishion rather than tomorrow's evident needs.

020

The report identifies on page S5, and these are ie summary pages, that if demand grows at a omparably high rate, as we are now told is the ase, the time to develop a major facility will be iort. The resolution we earlier referred to, vhich was passed at the annual meeting of the Iunicipal Electrical Association in Toronto in Iarch 1987, presents an option that speaks to iis very issue.

The resolution says simply, "Therefore, be it esolved that the Municipal Electrical Associa- ion encourage Ontario Hydro to assess the future eed for a cost-effective nuclear generating tation to be installed on the Ottawa River pstream of the Des Joachims hydraulic station."

The lead time required for a major supply acility is estimated between 10 and 12 years, and esterday we heard the Canadian Nuclear Asso- iation talking in terms of 15 years. We have real roblems.

The original resolution submitted by the Iydro Electric Commission of the Town of Deep Liver, with the support of the MEA, District 1, ealt with the Candu 300, now called the Candu ı, and was primarily focused on the fact that this ew modular design can be built and commis- ioned within four years or so after commitment. This is a significant reduction of time compared to any other facility with comparable energy production–estimated at greater than 400 megawatts–and one would anticipate a corres- ponding cost saving to the ratepayers of Ontario. This facility would be an 85 per cent Ontario- produced product, fuelled by Ontario resources.

This resolution was passed with near unanimi- ty by elected and appointed hydro commissioners from all Ontario regions. It is indicative of the support that local utilities have for nuclear energy systems. We point out that this resolution was passed during the period when Chernobyl was on everyone's mind, and it is indeed a compliment to the foresight and good judgement of the men and women of the MEA.

It is also important to note that this resolution has the support not only of the municipalities in the area of the proposed site but also the county of Renfrew, an indication of their feeling of confidence in the safety of Ontario Hydro and the nuclear industry.

Given the outcry over the cost of Darlington A and given the less than accurate predictions of previous energy demand, we feel the select committee should seriously consider and encour- age the supply option provided by modular nuclear plants rather than the large Darlington- style station, which requires a substantially longer lead time.

This past summer, we heard Ontario Hydro asking people to curtail their electrical consump- tion, which for some of us–I underline "some of us"–evoked shades of the situation in this province in the mid- to late 1940s. Are these the conditions under which we expect our Ontario industry to enter into continental competition? Do we need a louder warning that this province has listened too long to the kerosene and porridge mentality?

We draw your attention to appendix F, extracted from Energy and Canadians into the 21st Century–there is a copy of that report here–a report prepared for the Minister of Energy, Mines and Resources by a special advisory committee under the able chairmanship of Thomas E. Kierans. These two pages contain as much common sense about the nuclear option and its role in our energy future as you will find anywhere among the horrendous volumes of documentation you are no doubt obliged to consider.

In summary, we would like to reiterate that gains can be made through demand management programs, provided they are reasonable and take into account the diversity of Ontario's regions. A

viable and acceptable supply management option exists in the installation of a modular nuclear station on the Ottawa River upstream of Des Joachims.

We conclude by emphasizing the need for the termination of this constant round of commissions, inquiries and further commissions. As the title of our brief suggests, it is time for the political leaders of this province, both government and opposition, to flip the switch that will turn on development of the facilities we will need. All that is required is the courage to make a decision and stick to it. Your predecessors planned well to bring us this far. Now it is up to you to take us forward into the 21st century.

Thank you for hearing this brief. I will be delighted to answer any questions.

Mr. Chairman: Thank you very much. Are there questions from the committee?

Mrs. Sullivan: I was interested in your brief comments relating to local options for demand management. I am surprised, frankly, at your indication that you feel the local utilities should be designing and delivering programs without a province-wide context. I wonder if you would like to elaborate on that.

Mayor Smith: Yes. Generally speaking, I think we are on the front lines every day of handling inquiries from customers, etc., regarding the cost of power. I think when there is significant heat, if that is the proper word to use, on the local utilities, they are the best judges of what is needed.

I respect your comment regarding some assistance, and you will notice we did have assistance from Ontario Hydro as sort of a fatherly-type thing that says, "There is this particular AM method one can use, or the FM." But demand management generally has to be initiated first of all by the local utilities.

As a hydro commissioner and a person who has been involved with the Municipal Electrical Association, I see from time to time a sort of antagonism that starts at the local level where they are being dictated to, and I think that is unfortunate. I would much sooner see it go the other way where the local utilities, given enough questions and problems by the customers they serve, would then go to Hydro and say, "Can you help us on this?" I think it is a better way.

Mrs. Sullivan: Does your utility now do energy audits?

Mayor Smith: We do not do an awful lot of energy auditing in the sense that I think you mean. You are talking about conservation. Our community is very heavily committed to electri cal consumption, and I believe most of o community is very efficient in terms of deali with electricity. We have had losses on syster that are about two to three per cent, which v understand is very excellent. We are not spilli electricity somewhere. But I do not think we anything different. We are just very normal that sense. There is nobody out there real taking a look and saying: "My lord, what are v doing? Are we losing a lot of power? Are peop using it inefficiently?"

Mrs. Sullivan: I wonder if you have done a work, for example, with the local school board other institutions in terms of reducing their use electricity.

Mayor Smith: I am very proud to say that the county of Renfrew, for example, if there any place in Ontario that you could note as efficient operation, the Renfrew county scho board is one of the best in Ontario. They hav done a lot of that, and they do have a loa management system already in place in our hig school.

When one talks about reducing peak demanc which I have mentioned in this, these are majo customers. I hope I do not give you th impression we are going to be doing all o customers. We are doing effectively those th have the major loads: hotels, arenas, the curlin club, etc.

There has been a significant amount c progress in the school systems in Renfre country, the two public school boards and, believe, even the separate school board, but ther is more to do. We hope this FM-controlle system will improve it even more.

Mr. Charlton: I think what you are saying i the brief about demand management program taking into account the diversity of the provinc is a valid comment, because there are so man diverse and different things in this province.

I am a bit confused by your comments at th bottom of page 3, though, and I would like to jus clarify what it is you are referring to in the las paragraph there that carries on to the next page where you are talking about government imposed energy efficiency standards.

Mayor Smith: I can explain that. What w have discovered is that when one devises, say, new electrical motor that is the latest and the bes and a manufacturer or somebody who uses a lo of electricity is obviously trying to cut their costs these motors are physically quite different. Wha we are suggesting is that if that motor is ther deemed to have to be put in or even replaced, you

re going to incur a cost and a reaction from the erson who is going to use the motor that is not oing to be too nice. That may not be the case lways, but it just points out that you need a little exibility, not a universality.

I think most people use common sense. If it akes sense to install a more efficient motor, you ould do that, but I do not think anybody in usiness is going to throw out all his motors and o get new ones. If that is imposed, then I am ind of worried that that could be the backlash.

030

Mr. Charlton: I think it is clear that you are ferring to standards then for appliances and so n.

Mayor Smith: Yes.

Mr. Charlton: Do you really feel, especially light of the comments you have made in the ief about Ontario's relationships with other risdictions and specifically our competitive- ess with our neighbours to the south, that we can fact avoid moving to efficiency standards hen they are doing that themselves?

Mayor Smith: I do not suggest we do not ove to efficiency standards. I come back to the mment I made about keeping it in perspective d not necessarily forcing it. I may be wrong, ut I firmly believe the best way to get people to ake change is for you to be creative and for you suggest; then they come around.

I think people are generally pretty good. I do ot think we need to do that. I think Ontario dustry is reasonable. I hear a lot of criticism out how wasteful we are. I do not really see at. I hear that hue and cry all the time. It is like a t of things that are said, but nobody really allenges it. Where are we wasting it? I think ir new manufacturing of refrigerators, etc., is ing reasonably well. I think we are as good as yone. I do not know where the waste is coming om.

Mr. Charlton: I think you are right. The mment gets made a lot. I think, though, if you ere to sit down and go through some of the esentations this committee has received, fairly ell documented presentations, then the com- ent that we are wasting a lot of energy starts to come a little clearer in the context of actual cumented case studies of energy waste. It is a ct.

You talk about flexibility. It is a fact that our ighbours to the south, with whom we are going be major competitors as a result of both the ng-standing trade relationship we have had ith them and the impending move into a further deeper relationship under the free trade agreement, are moving to phased-in, fixed, hard-line, set efficiency standards for appliances, motors and so on.

I guess I just repeat, do you honestly believe that it is wise or viable for the Canadian jurisdiction, and specifically for Ontario, to resist going that route when in fact we have to compete with those people in a significantly greater way in the future than we have even in the past?

Mayor Smith: I cannot agree more with you about that. It is obvious that you have to respond to what is out there. But I guess what I am saying again at the bottom of page 3 is that if you start cranking up the government-imposed standards, I think you would be better to take it slowly. I do not think one is going to change this overnight, notwithstanding the fact that the Americans, if that is whom you are referring to, may have a higher standard for efficiency in certain appliances, etc. Obviously we will have to compete with that. I do not have a problem with that.

I think my problem is when those government standards start reflecting on our own industry, where in terms of the energy they are using, which is primarily electricity, we are forcing them to make changes. If that is to be role of Ontario, that all motors of a certain size have to be changed to be more efficient now, then I think that is a bad move.

I do not know if I am explaining myself well enough, but I believe you should deal with the electrical facilities you now have in place, recognizing that in time those will change. I do not having any problem at all with manufacturing–I think that is perfectly reasonable–but again I caution against a forced implementation on all industries.

Mr. Charlton: I think the approach of the committee and of the government has to do with the availability of new products and not to force every motor in the province that is in operation to be changed by a certain date. I think both the government and this committee expect that as we proceed through the question of efficiency standards for appliances, motors and other things, those standards will apply to the stock that will be available as new after a certain date. Nobody expects the capital replacement of operating stock out there until such time as either the need is there to change it because it is finished, worn out, or the owner chooses to charge because there is enough of an efficiency advantage for him to do so.

Mayor Smith: Right.

Mr. Runciman: You mentioned usage of electricity in your own community, and I think you said something like 57 per cent.

Mayor Smith: Yes, 56 per cent. It is roughly that, yes.

Mr. Runciman: You also mentioned you have perhaps the highest rates in Ontario.

Mayor Smith: Eastern Ontario.

Mr. Runciman: That does not seem to jibe in terms of high rates plus increased consumption.

Mayor Smith: There are two components, of course, to your hydro bill, one being energy and the other being peak. We have a peak that occurs at 8:15 a.m. on a cold day in January and it happens to occur that kind of way every month. Of course, you can go 29 days in the month and it will be very reasonable. You hit that one cold day and boom, your peak has gone to the top and that is your bill. There are the two components. That peak occurs at 8:15 and then it drops and flattens off and it may come up a little in the evening.

Normally, if you are in a community that had an industrial base of some sort, you would get that peak in the morning and then it would sort of stay there, because when you would switch off, when my wife turns off her toaster and her hot water and whatever, there is a picking up of that electrical demand by, presumably, industry in the area. Ours is a little different, and that is why we had to deal with it. I would hate to use the word "unique." It is probably not that unique; there are probably other communities that have that.

Ontario Hydro's peak, by the way, does not occur in the morning; it occurs around 5:30 in the evening, But Ontario Hydro has to provide for Ontario. On peak, it cannot just say, "Sorry fellows, we can't give it to you at eight o'clock in the morning." But we do not have an offsetting industrial load. Atomic Energy of Canada is a huge user of electricity, but it is a direct customer, so it does not feed into the system.

Mr. Runciman: But your consumers are paying the highest rates in Ontario.

Mayor Smith: Yes.

Mr. Runciman: Yet you still have the bulk of use in the homes.

Mayor Smith: That is right.

Mr. Runciman: At those high rates, I am just wondering, are the other sources–gas and oil–not competitive?

Mayor Smith: We would be delighted to have gas if the Ontario Energy Board would allow us. We are unique in that sense. We applied for gas–

Mr. Runciman: There is no gas line?

Mayor Smith: No. They will not give it to u We are marginally uneconomical, Mr. Runc man, eastern Ontario. Can you imagine, margi ally uneconomical?

Mr. Runciman: A lot of things that a uneconomical.

Mayor Smith: Yes. If they do not want t power, tell us; we will keep it in Renfrew count If they do not want the resources, fine, we w keep them in Renfrew county. But we get real upset when the Ontario Energy Board down he tells us we are marginally uneconomical.

In other words, what happened was that th wanted to give us gas but they decided becau there was going to be some–to use the famo word they used–cross-subsidization by some the people in southern Ontario who now ha gas, so they said: "No, no. Renfrew county, Chalk River-Deep River, does not get gas." was very offensive, and nothing has come of In fact, we tried to get gas.

We have some small processing industrie For example, we have one of the very fe Ontario-owned dairies in our community; it us a lot of propane, but natural gas is cheaper. V would like to see the products reflect that, but t Ontario Energy Board certainly is not going give us any gas. The pipeline, by the way, si less than half a mile away.

Mr. Runciman: You mentioned putting modular Candu 3 somewhere in the Ottav River, I think.

Mayor Smith: Yes.

Mr. Runciman: What is the rationale behi that? Are there studies that have been done in t past with respect to that as an appropria location?

1040

Mayor Smith: I can give you a little histor We have recognized for some time that t nuclear power demonstration facility, which v are all so proud of, for 25 years produced well research and development. We recognized, ev in 1978, that her lifetime was limited. We kne that her contribution to research was going to e eventually, so in 1978, we inquired as to replacement for her, a 600 or whatever.

At that time, as you recall, Darlington h been committed, and I guess even forecasti back then was not the best. It certainly was n dismissed, but there were a few problems raise one of them being the water supply. If you a familiar at all with the Ottawa River, in particul our area, above Des Joachims is the fourt

argest headpond in Ontario. It is the fourth-argest producer, by the way, of electrical ıydraulics in Ontario, after the Sir Adam Becks ınd the one at Cornwall.

Putting the nuclear station above that with an nput into the normal part of the river would llow the outflow of those warm waters that vould be complementary to the hydraulic facili-y, which is Des Joachims, and its 400 mega-vatts. In other words, for those of you who know nuch about the thing called frazzle ice–ice that dheres to penstocks of hydraulic stations–with his warmish water, we would increase the fficiency of Des Joachims as well; so we think it s a very practical place to put it.

It is not a new theory. It is one that had been onsidered for Fitzroy Harbour or Chats Falls. Ve feel it would work very well there, and it is a ery nice design, we understand. We think it is oing to be an important component of Ontario Iydro's facility.

I do not think Hydro is all that keen on it, to be onest with you. I think they like driving their 00s and their 850s or whatever they have. I do ot know if they want to get into the smaller ones, ut it is an exciting one, and it makes a lot of ense to put it up there. We are very familiar, of ourse, with the nuclear industry, having lived vith it for 45 years.

Mr. Chairman: If there are no further uestions, I would like to thank you, Mayor mith, on behalf of the committee, for coming own. I hope you enjoyed yesterday's delibera-ons. We appreciate your speaking with us this norning.

Mr. Smith: I did, Mr. Chairman. I thank you or hearing me. I would also like to extend an nvitation at any time to the select committee to ome and visit with us in the Ottawa Valley. We vould be delighted to have you. I know you are ery busy, but if any of you get the chance, even o come as a select committee, we would be glad o see you.

Mr. Chairman: The next witness is the ociety of AECL Professional Employees, Dr. ndrews.

SOCIETY OF AECL PROFESSIONAL EMPLOYEES

Dr. Andrews: I would like to thank you all on ehalf of our professional society, which we call APE, for the opportunity to speak to you today.

Our brief deals with some general questions hat I think are important to be considered in lectricity planning. The first one is the whole uestion of what principles one should use when planning for electricity demand. The second part deals with an examination of some of our long-term options, because I think we have to remember that energy is a physical quantity and is governed by the laws of nature. Nature knows nothing of economics, politics or anything of that sort; so any energy system we plan, as a minimum requirement, must be consistent with natural law and physical realism. Then there are many other considerations on top of that as well.

Our major long-term options are nuclear fission with advanced fuel cycles, perhaps nuclear fusion, and then there are various solar-based renewable energies. We presently are mostly dependent on fossil fuels. Fossil fuels are finite in extent, and we are entering the declining decades of oil and natural gas, as we will see, and even coal is available for perhaps a century or so. There has been a lot of discussion recently of the environmental problems of fossil fuels. I will come back to some of these things.

With these ideas as a background then, I want to discuss, first of all, the questions of electricity planning, and for that purpose, I will show some slides. The first figure is taken from the Hydro document that is under discussion here. It is simply their projection of annual energy use. The range, from the upper through the most likely to the lower, is given in the report as a 60 per cent probability. In other words, there is a 40 per cent likelihood of being outside that. A ratio of 60 to 40 is really not much different from the flip of a coin. We should remember that.

To put it in simple terms, and of course this is simplification, if we look ahead to the year 2005 and ask how we get from where we are at present to that time, if we were in the lower regime, then to put it in simple terms, we could simply mothball two Bruce B reactors. To get to the upper limit, we would have to build 26 new Darlington-sized reactors. It seems to me that if one has to make decisions on the basis of projections like this, it is very difficult indeed.

Seeing these projections prompts one, particularly if you are given to this sort of habit, to paraphrase the words of Pope, in this case, "To err is human, to forecast is to divine." I think you have to be divine to forecast very well in this field.

Why is it so hard to forecast? I think this gives us an idea why. This is another figure taken from the Hydro report. What it gives is the electrical intensity in the economy as a function of time. It is amazing actually that, say, from the year roughly 1970 to the year 2005, electrical intensity varies by only about 10 per cent, the

maximum variation. At the same time, the actual amount of electricity produced from 1970 to the present went up almost by a factor of two. It could go up as much as a factor of two again, depending on what the future holds for us.

Therefore, in fact, when one is projecting electricity demand, really one is projecting the performance of the economy. That is a notoriously difficult thing to do because the performance of the Ontario economy depends so much on things that are outside our control.

What principles might we use in order to deal with this problem? I think the crucial one in my own mind is that we have to plan for the results we want. If we plan for zero energy, then we will get it. If we plan for very large supplies of energy, we will have them. It seems to me we have to say what is desirable growth in the economy, what is the minimum desirable and at least make sure we plan for that.

Second, it is in everyone's benefit to improve the response of the system; that is to say to cut down lead times of various types so that as time progresses and the economy deviates from our plan, we can adjust the system. In that way, one can try to efficiently match the demand to the supply and vice versa.

What are some of the considerations we should think of when we are planning? These are a few of them and they are important in my own mind at least. First of all, we have to face up to the depletion of oil and gas, particularly natural gas.

Second, we are well aware of environmental deterioration, acid rain, deforestation and climate change through the greenhouse effect. When we look down the road, one of the options that is almost certainly going to come along is the hydrogen economy. We have to be prepared for that.

We also have to remember, and it is something unfortunately that some people do not realize, that hydrogen is not a source of energy. Hydrogen is only a way of transmitting energy.

Lastly, we have to look at the viability of the long-term options because if we plan on all sorts of things and in fact they do not work out, then we are in deep trouble.

Going to this question of natural gas for a moment, you see–again, this is from the Hydro study–that natural gas is a major component of Ontario's energy, and it is a growing component. Yet in the lifetime of people now living, natural gas will cease to be a viable source of energy, almost certainly.

It is similar with oil. We are luckier than most because we have the tar sands, but oil will be an increasingly scarce and valuable resource as tin goes on. The National Energy Board looks these things periodically and these are i projections for natural gas. You see that regar less of the price regime, whether it is a high low price, in the planning period that Ontari Hydro is discussing the demand for natural gas going to be exceeding the supply.

1050

What implications does this have for electric ty planning? It seems to me that there are at lea three. One of them is, of course, that when th becomes part of the public consciousness, peopl will realize that natural gas is not a reall long-term option, and therefore, when they hav to choose a home heating system, for instance, c an industry chooses a source of process heat, the will think twice about natural gas. That is not th case today but 20 years is not very long in th future.

Second, all of the schemes that we talk abou with cogeneration that involve natural gas are no viable in the long term. In the United States, tha could be a real problem because an awful lot o cogeneration there in fact burns natural gas. Th Americans, it is widely acknowledged, ar facing a natural gas problem in the rather nea future.

A third thing is that if we do think ahead to th hydrogen economy, then that will be a competi tor for natural gas supplies because one of th ways of making hydrogen now is by the stean reforming of natural gas. Hydrogen will b important not only as a primary fuel, but also fo upgrading the tar sands fuel and also fo upgrading biomass for making liquid fuel. One could be much more sparing in the use of the carbon component if one had enough hydrogen to upgrade the molecules that are being produced.

Let me look briefly at the renewable options. We are all in favour of renewable energy because the fact is that, if we look ahead, our knowledge of the physical universe tells us that in the long run we have renewable energy and we have some form of nuclear energy, and that is it.

I might add that many people have a sort of comforting feeling that something will always come along to solve our problems. I think that is not a justified article of faith. The reason is that the last major energy discovery, that is to say the discovery of any new energy form, was made 49 years ago, and that was the discovery of nuclear fission. Since that time, there has been nothing discovered in the world of science that points even a tiny bit towards any form of energy other than the ones we presently know about. Some-

thing might come along in a miraculous way, but we have no right and no reason to expect it and we certainly cannot plan our future based upon that expectation.

Hydro electricity, of course, is very successful. Why is it successful? It is successful because nature gathers the resource and channels it into a limited geographical area. We then build a dam and that gives us integration or storage, so we can smooth the supply of energy relative to the primary input, which is rainfall. However, as we have seen, there is limited scope for expansion in Ontario. Precipitation is very strongly seasonable. There is lots of it in the spring. In the dry summer there is very little. Perhaps in winter there is very little.

If we have increasing problems with our forests–they will be under a lot of pressure for various reasons–then that also causes the water-holding properties of watersheds to deteriorate.

Lastly, of course, climatic change can have a very big impact on hydro. The prediction is that we will have a more arid climate. Therefore, if we count on a lot of hydro in the future, we may have a problem with that. It remains to be seen, one way or the other, but it is not certain by any means.

If we look at biomass, this is another, you might say, proven form of energy. We know how to cut down trees and we know how to burn wood. This is all established technology, and it is certainly feasible to burn wood to generate steam to make electricity. Some cogeneration schemes in the forestry industry, of course, do that. But if we look at it realistically in terms of large-scale energy production, if we have energy plantations, which are these special poplars or something that grow very fast, it still takes roughly 200 square miles per 100 megawatts. If you are in regular woods, it is at least 2,000 square miles per 100 megawatts.

Therefore, if you simply wanted to replace Darlington's output by burning trees, and it is regular average forest, you would have to harvest almost one half of Ontario's productive forest area. You would have to set it aside purely for burning at Darlington or in many distributed places; it would not all be in one place. Nevertheless, while it is certainly a proven technology, the amount of energy that is available is not enough to solve energy problems. It can help in certain locations.

If you look at solar energy, one way of doing solar energy is solar thermal; that is to say, you reflect the sunlight on to a collector and you raise steam, etc. There is a big one at Barstow, California, that has been in service now, one way or another, for almost a decade. It is rated for 10 megawatts electric. They tested it and played around with it for two years and they have had a three-year power production test.

The results are in for the first two years. The first year was eight per cent capacity factor and the second year was 12 per cent. Originally, they expected 30 per cent when they built it. Their revised expectation is now 17 per cent, simply because of all the parasitic losses involved. I am not putting this down; I am simply saying this is very difficult technology. This is an idealized place, sort of a desert area, and even under good conditions it is difficult and does not perform particularly well. It will, no doubt, do better in the future.

Another solar technology which is in the news quite a lot is photovoltaic technology; that is to say, using solar cells to generate electricity directly. The top set of curves are the performance of four installations that have been running for several years. What is given there is the amount of energy they are producing cumulatively, as megawatt-hours per kilowatt. The slopes of those curves are related to the efficiency of the operation.

Georgetown University in Washington, DC, has had an average efficiency of seven per cent. The best one, Lugo, has had an efficiency of 22 per cent. That is outside Los Angeles in a desert area. The fact the curves are more or less straight says they are actually performing reliably. The problem is not that there is anything wrong with these devices; the fact that they have low efficiencies is a measure of the source of energy they are using.

If we look at the best performing one, Lugo at 22 per cent, the bottom shows the monthly capacity factors for one year. It varies anywhere from 10 per cent up to, a few times, as high as 25 per cent averaged over the month. The dots show the two-hour averages of power output during daylight hours. It is all over the map. That reflects the fact that every time a cloud goes overhead, the output drops way down. The areas in July and August have low efficiency, even though there is lots of sunlight because the generators heat up and are less efficient.

Again, in terms of steady, reliable supply of electricity, there are serious problems here. It is all right as an adjunct source of energy, but to consider it as a major source of energy, it is full of problems. This is not a fault of the devices; it is a fault of the nature of the sun, the fact that you are collecting the energy on a second-by-second

basis. The solar thermal has some storage built in so it tends to smooth out those peaks.

Last, we will say a few words about wind energy. Again, this is from a recent review from the Department of Energy. This is getting to be a mature technology in the sense that there have been windmills around for hundreds of years and there has been a lot of effort for the last decade or so. They have now installed 15,000 big windmills in the United States, in California and Hawaii. These are very good locations.

One of the problems with wind power is that the energy you extract from the wind goes as the cube of the wind velocity. If the wind velocity drops 20 per cent, the energy extracted drops 50 per cent. Therefore, it is crucial to have good locations where you have steady winds at a reasonably high level, and some of those have been used in California and Hawaii. They have an installed peak capacity of 1,500 megawatts, which sounds impressive, but in fact the capacity factor in 1988, averaged over 15,000 of them, was only 13.7 per cent. These are in prime locations.

1100

If we wanted to replace Darlington by similar wind generators, assuming we had the places with good wind properties to put them, it would take 270,000 of these things operating at this level of efficiency. Again, this is not to put down windmills. These people are doing their best. The problem is not with the windmill and it is not with the people; it is with the wind. You cannot control when the wind blows. It turns out that if you want to harvest a lot of energy from the wind, you have to have very big machines and they tear themselves apart. There are real serious materials problems. Wind has its place, but it is not at all clear to me that it is ever feasible to use things like wind, biomass and direct solar collection to replace base-load generation that we need for a modern industrial society.

The last thing I want to mention briefly is conservation. We are all in favour of conservation. I think we have to be a little bit careful not to oversell the potential. In Ontario, since 1972, the energy-intensive economy has gone down about 20 per cent, according to the Ontario Hydro document, and the electrical intensity has gone up about 15 per cent, so part of our efficiency gain of course is from switching to better technologies, which frequently use electricity. We often hear statements that Japan could produce as much as we do with half the energy, or Sweden can or whatever. I think these are rather simplistic statements because they take no account of the different industrial mix an conditions.

As examples of this, these are from variou states in the United States. I think this is dat from 1971. This is the energy intensity of th state products in various states, and you will se it varies by at least a factor of four, almost factor of five from state to state. That has nothin to do with efficiency; it has to do with the sorts o things they are doing in those states as part o their economy. We have to be very careful whe we claim very large capability of energy savin based on these international comparisons, be cause even within a country the variations ar very great. It is not due to efficiency alone.

I think that is enough for my slides. I wil summarize now what I have been saying. Societ is rapidly approaching a time when it is going t be limited by nature. As I said, nature know nothing of politics and economics, but sh slavishly follows the laws of physics. Prosperit has been fuelled by cheap and abundant fossi resources which are really accidents of ou geological history. These will be substantiall depleted during the lives of many now living an nature has provided no easy replacements. personally believe this should be a central realit in all of our thinking in this business. The rang of options is clear. Hydro and nuclear fission ar proven to be economic, biomass is establishe but limited in scope and the verdict is not yet i on wind, solar and nuclear fusion.

In the coming decades, an adequate an reliable electricity supply at affordable price will be a major economic advantage. It i imperative to assume a healthy economy and t make provision for energy substitution in ou projections. Temporary overcapacity at certai times is a small price to pay for energy security and it is probable that export markets will exist i any case. If one looks at the picture in the Unite States, it is going to be wanting electricity. If w can shorten the lead times, it will be a great asse to supply-demand matching.

Last, we have to broaden this nuclear debate. It is time to examine our non-nuclear option with the same detail as has been done repeatedl for nuclear power. We admit that nuclear energ has some risks, but other technologies have a well. I believe the biggest danger of all is that w desert proven technology out of fear and end u with an unreliable system and severe energ shortfalls.

Renewables are all subject to forces that ar beyond our control. It would be a major ste backwards to surrender our energy security to the

agaries of nature. We have three recommendaons, which I have covered in a way. Electricity anning should be based on the desired future ith due regard for the necessity of fossil-fuel ibstitution and the evolution of hydrogen chnology.

Nuclear energy should be supported and xpanded. All of the smaller short-term options hould be used, but not as subterfuges to delay nd thereby weaken the nuclear option. I think ere is no question that there are people whose asic goal is to get rid of nuclear energy. That is eir privilege. But we have to be careful that ome of the things they propose are not simply rected towards this goal, hoping through delay sort of starve the industry to death.

Last, we should examine the critically renewble technologies, and those which show prome should be brought through experimental ages to pilot plant levels as soon as possible so e can plan a future energy mix which is alistic. I and my society are all in favour of search in renewable energy because I think it is ucial to establish as quickly as possible those e can count on and those we cannot. Thank you ery much.

Mr. Cureatz: Of course, I have been sympaetic to nuclear energy with Darlington being uilt in my riding. After some of the testimony of esterday, I am concerned about the possibility f energy conservation and the problems I think e do have with nuclear energy; waste disposal eing one. Jim McGuigan has often spoken on aste disposal and the high level of radioactive aste. But for me the overall impact is the olume of energy we need.

I can see some movement at least coming in ntario Hydro particularly, and even Mr. Rubin f Energy Probe indicated that, albeit in a ackhanded compliment. I have seen Hydro noving now and trying to get into small-scale roduction in localities where it is warranted.

The base load that is required to keep lectricity flowing in Ontario is just a horrendous mount of energy. Again, it reinforces to me that s yet, I am not comfortable with seeing too nuch else on the horizon which is going to upplement that, notwithstanding all the other roblems we have in the other fields, coal roduction and so on.

I guess it is not really a question. It is just more comment or appreciation of bringing home to ne personally the volumes of energy needed and hat it is not so easy to say let's go into ogeneration and alternatives when they are just not there. I wonder how far down the line we are with fusion.

Dr. Andrews: Nuclear fusion is a long-term possibility, but it is technically very difficult. People have worked on it for decades now and we are still factors of 10 or more away from a feasible, practical system to generate electricity. It is also horrendously difficult. The first fission reactor operated within a few years of the discovery of the phenomenon. The phenomenon of fusion was discovered in the 1930s and we are still probably decades away because it is something that naturally occurs in the sun, not on earth.

Mr. Charlton: You took the time to run through with us most of the alternatives and pointed out a number of the long-term shortcomings in terms of those alternatives. We could go through a number of questions around that whole package.

You pointed out, for example with industrial cogeneration, that it is not too far down the road that some of our major industries now using oil, gas or coal are going to have to start looking for substitute fuels. I do not think there is any question about that in anybody's mind because we all understand that all three are finite resources and, as we continue to consume them at increasing rates, they are going to run out.

On the other hand, from a perspective in which we are planning now, looking at the next 20 years, given that we have, aside from our energy industries, major industries consuming gas, oil and coal, and given that we know full well that in large part those industries are, in their production processes, inefficient in the use of that energy–in other words, there are huge energy losses going on out there–does it make sense for us to ignore the utilization of those energy resources over the course of the next 20 or 30 years?

Dr. Andrews: No, I do not think it does. I think we have to be efficient where we can; it is silly for an industry to waste energy. At the same time, we have to look at the big picture and I think we need balanced development. Whether we like it or not, nuclear is the one option we know about scientifically and technologically that will be around 100 or 1,000 years from now if we choose to have it, which can be sited almost anywhere and can deliver energy when we want it in the quantities we want. Therefore, I think we have to maintain that option in a healthy state and develop these other things. As I say, we are not against these other technologies. I think in a few decades our back will be to the wall in the energy

field and we will need everything we can lay our hands on.

I think it is a tragedy that presently the two groups which are supporting the long-term options–namely, the nuclear industry on the one hand and the renewable people on the other hand–are fighting one another. Our real enemy is the depletion of fossil fuels.

Mr. Charlton: I think that is a fair comment. On the other hand, we have two basic, realistic problems with the nuclear industry at this point. Whether we like it or not, they are realities. One of them has been raised a whole range of times during the course of these hearings, which is the long lead time and, as you showed in the first slide you put up, given a higher load growth than the expected load growth, that we may in fact not be able to have a nuclear plant on line when we need it.

The second one is the public concern and the public resistance around the question of nuclear waste. Whether or not scientists agree with that public concern, it is there and it is real. From the perspective of attempting to deal with those two major concerns that fit into the whole mix of things we are looking at right now, it seems to me that there is a whole range of things that have much shorter lead times and do not have the same level of public concern, which we can deal with, as I said, in the context of planning the next stage of our growth in energy.

Dr. Andrews: We recognize that the public is worried about various aspects of nuclear energy, including nuclear waste. As you say, scientists may believe it can be dealt with, as I do, but we have to convince the public. After all, the nuclear industry is the only industry that can deal with its waste. That is more than you can say about the burners of fossil fuels. They cannot deal with their waste; it is physically impossible. We can.

Any study or analysis which has ever been done suggests that even if you are living right on top of the repository and getting your water from the ground, the probability that you are going to come to grief is microscopic compared to other hazards in life. That is based on decades of study, not only in Canada but in other countries, Sweden among others. It is all in the open literature. It has been prereviewed and it will be prereviewed and we welcome very much the federal government initiative to bring this waste debate before the public yet again, because we feel we are on certain ground. To my mind, nuclear waste is the least of the worries we face at this point. I worry greatly for the future of my children, but not because of nuclear waste.

Mr. Charlton: You do agree, though, that it a reality which has to be dealt with.

Dr. Andrews: Nuclear waste is a re technical thing that has to be dealt wit absolutely. But I believe it can be dealt with.

Mr. Runciman: The mayor of Deep Riv was here just before you and he mentioned t use of the Candu 3 and the modular units. W have had witnesses from the nuclear indust before us earlier who sort of downplayed t usefulness of Candu 3 in an Ontario enviro ment. I wondered how you felt about it. Ho appropriate is that technology?

Dr. Andrews: I am certainly not an expert this field. The route in Ontario up until now h certainly been large generating stations li Darlington, Pickering and Bruce. On the oth hand, the direction we are talking about, f instance cogeneration, is smaller, decentraliz generation, in which case you have few transmission losses and things of that sort.

From my own point of view, I think it wou be a good thing to build. We have transmissi lines. We have the water and things of that so Hydro, I guess, its advisers and regulators, ha to decide whether it is in their best interests to it.

From the point of view of the nuclear industr I think it would be a very good thing becau nuclear stations are too large for many jurisdi tions. Something like a 300-megawatt station i much more reasonable size for smaller electric systems. Personally, I am in favour of it but think you have to go beyond very tradition economic arguments perhaps to justify it.

Mr. Runciman: We are pressed for time. have a number of questions, but I will drop the You talked about coal lasting about a century.

Dr. Andrews: It is of that order. It depends, course, on how much of it we use. We have qui a lot of it in Canada, but we will use more of Coal is in the time range of a century or so, whi oil and gas are decades.

Mr. Runciman: What about uranium? Wh are the projections in respect to uranium?

Dr. Andrews: Uranium in sort of high-quali ore is relatively limited. There is enough f decades, but if one goes to advanced fuel cycle then you can get at least 50 times more energy o per gram of uranium that you put in thereafter

If you do that, then you can go to very lo grade ores or even sea water and extract it fro sea water. Then there is no reason to believe th there would not be enough uranium available the environment to last essentially for ever if y

to the efficient, advanced fuel cycles. In that nse, it is renewable energy.

Mr. Runciman: What does that imply, ough, going to advanced fuel cycles? For ntario, what does it imply?

Dr. Andrews: Ultimately, when the price is ght–in other words, when regular uranium goes in price–then one would take the spent fuel at is presently stored. One would reprocess it, ke out the uranium and the plutonium and put at back into the reactor.

The fission products are the nuclear waste. hat is what nuclear waste is. That is the ashes, hich would presumably be put into ceramic or ass. That is what would go down into the rock pository some time in the future.

Mr. Runciman: In the not-too-distant future– u are talking about decades–we are looking at very costly process with respect to an advanced el cycle that would make this truly usable?

Dr. Andrews: No, it is not particularly costly. his technology has been used for decades. here are some nuclear power systems that have ed it all along, as in England. Fuel reproces- ng is already used in various parts of the world. is chemistry, basically. It is not particularly fficult.

Mr. McGuigan: I do not have a question. I st want you to know that you are the third rson who has come in with the idea of setting als; the first being myself, the second being a ofessor from the University of Waterloo, and urself.

Perhaps what Hydro is doing behind all of ose charts, graphs and econometric models and on, I think, is really setting a goal consistent ith where we want to be in relation to forestry, ining, agriculture, industrial economy and erything else. But you are not alone.

Mr. Chairman: Dr. Andrews, I would like to ank you very much for coming in and speaking ith us this morning.

Our next witness is the Chalk River Techni- ans and Technologists Union. I wonder if they ight come forward. We have been given your esentation this morning. It has two parts. Mr. urphy, if you would introduce the members of ur panel, I will turn the floor over to you.

120

CHALK RIVER TECHNICIANS AND TECHNOLOGISTS, LOCAL 1568

Mr. Murphy: Our union is the Chalk River chnicians and Technologists Union, Local 68 of the Canadian Labour Congress. Joe Munch, on my right, is the current president of the union. Jeff Cox, on the extreme right, is the vice-president. Currently I happen to be chairman of the energy committee. I believe Joe Munch and Jeff are going to present the brief. I myself will comment later on these attachments that we have circulated with the brief to the members.

Mr. Munch: Our brief is entitled, Meeting Ontario's Energy Needs in the 1990s. The Chalk River Technicians and Technologists Union, Local 1568 of the Canadian Labour Congress, on behalf of its members, welcomes the opportunity to present its comments to the select committee on the very important subject of Ontario's energy future.

Our union represents some 500 technical employees of Atomic Energy of Canada Ltd. at its Chalk River nuclear laboratories. Over the years, Local 1568 has participated in the debates on energy and nuclear power at both the federal and provincial levels and, as well, within organized labour circles.

We have appeared before the select committee previously during its hearings on Darlington in 1985 and have participated in the recently completed Ontario Nuclear Safety Review committee. Within organized labour, Local 1568 has a seat on the Ontario Federation of Labour standing committee on energy, conservation and pollution control. We also have a member sitting on the energy committee of the Canadian Labour Congress.

In all of these forums, our position is consistent: Canada, and in particular Ontario, is extremely well placed to provide the energy needs of its citizens and businesses by continuing to develop electrical energy production from the Candu nuclear reactor system where such development makes economic sense.

With this background, Local 1568 offers the following comments on the Draft Demand/Supply Planning Strategy prepared by Ontario Hydro.

Ontario, as well as Canada as a whole, is evolving into an electrical energy society along with many other parts of the industrialized world. The reasons for this are obvious. Electricity has proven to be an extremely versatile energy commodity which can be generated economically from a variety of prime energy sources, is easily transmitted both over long distances and locally and, at the point of use, is entirely under the control of the consumer. Additionally, it need not be generated until needed.

Given a well organized and efficient agency responsible for generating and transmitting, such as Ontario Hydro, electricity is more and more becoming the energy option of choice for residential, industrial and business consumers. As evidenced by energy use statistics, electrical consumption continues to grow year after year even when total energy consumption declines, as it did during the recession in the early 1980s.

However, Ontario's economy is still heavily dependent on resource-based and manufacturing industries. While these are performing well at the present, many have become outdated and uncompetitive, according to the recent report on Ontario's long-term economic strategy prepared by the Premier's Council. International competitiveness is a real and growing concern in every part of the country, particularly in Ontario. Our traditional industries can no longer hope to compete solely on the basis of advantage in access to raw materials, skilled labour and markets. Production technologies and energy consumption are becoming overriding factors.

Many examples exist of the growing utilization of electricity in industries once heavily dependent on fossil fuels. Steelmaking, for instance, once dependent on large quantities of coal, now must be based on electric melting, refining and casting technologies to compete. The mining industry also realizes competitive forces are pushing it to electrification and away from the reliance on expensive petroleum supplies. Comments by representatives of Inco and Noranda at a 1986 workshop on mining automation sponsored by the Canadian Centre for Mineral and Energy Technology and the Ontario Centre for Resource Machinery Technology allude to this fact.

Business decisions on investments are now heavily influenced by electricity supply factors such as security and reliability of supply and price. Ontario can continue to capitalize on our present advantages only if investors perceive that our electrical supply system will not fall behind new demand.

Individuals also compound the demand for energy, and increasingly electricity, both in their private lives and through their demands on society's infrastructures. One need only consider the impact of the continuing use of thousands of air conditioners purchased during the recent heat wave. Many more Ontario residents fully intend to install home cooling equipment when suppliers can restock. This significant new component of future electrical demand is unlikely to have been fully factored into the earlier planni strategies.

While we can all agree that the more efficie utilization of energy is highly desirable and th less waste of the products energy helps produce essential, there is little support for the so energy-path philosophy. Too many of us Ontario personally recall experiences from o youth in the pre-electric age to be fooled by th myth. In rural Ontario, that age ended only aft the Second World War.

All of these factors convince us that the annu growth in demand for electrical energy w continue to be higher than Ontario Hydro recent forecasts, at least through the next decad Other, more expert, organizations, such as t National Energy Board and the Department Energy, Mines and Resources, have reach similar conclusions in recent years. Ontar Hydro has been sharply criticized for inaccurat ly predicting load demand for some time, but like everyone else, has no crystal ball or mag formulas. All any utility has to work with a recent statistics and future analyses. There is r way to accurately factor future events, such as sudden change in weather patterns or a medi influenced public appreciation of environment damage, into the planning process. A plannin strategy that provides for a range of futu demands is obviously needed, but it must b based on the more probable estimate of demar growth, not one set unrealistically low because political pressure. There is one factor that can b confidently predicted, however; that is the publ outcry if the utility's planning strategy fails meet the future electrical demand.

At present, a large part of the electrical supp in Ontario is still generated in coal-fired therm stations. Ontario Hydro's draft document ind cates that future reliance on coal is also a maj part of its planning strategy. We believe this wrong for the following reasons.

Increasing coal's share of the electrical gene ation mix will result in a significant increase total cost for Ontario. Direct costs of generatic will be increased because of escalating co prices and large investments required for emi sion equipment. Additionally, the problem disposal of increasingly huge volumes of coal as will be compounded. These costs will, of course be passed on to the electrical consumer in th form of higher rates.

There are other costs to the province as wel Ontario has no suitable indigenous coal deposit so all purchases are from external sources. Th present large outflow of Ontario's revenues to th

United States or western Canada is not beneficial to the economy of Ontario. Increasing it is even more negative.

The less obvious cost is that to our environment and to ourselves. As discussed below, the damage due to emissions from coal-fired electrical stations has reached alarming proportions throughout most of the industrialized world, and certainly in Ontario. We cannot afford to ignore these environmental costs any longer, and solving the problem will not be cheap. Less widely appreciated are the equally serious problems associated with the toxic elements contained in both airborne emissions and in coal ash. Large quantities of heavy metals, such as arsenic and lead, are added daily to our air, soil and water. The long-term real costs to solve these environmental and human health concerns are only now beginning to be calculated.

Increased use of coal to supply Ontario's growing base load demand affects employment in the province in two ways. First, electrical rates will be increased, thereby reducing Ontario's competitive edge in attracting and retaining industry. Direct loss of present jobs and diminished potential employment in the future seem to us to be inevitable. Further, our payments as electrical consumers will continue to be spent to support the coal industry and, in the process, provide many jobs in the US. Surely it would be wiser to support jobs in Ontario.

1130

Some of the most serious environmental problems facing us today are the direct results of the combustion of fossil fuels: coal, oil and gas. Acid rain, smog, the greenhouse effect and toxic heavy elements are all affecting our environment and, indeed, our own health in a very serious and long-lasting way. Coal combustion in Ontario Hydro's thermal generating stations is contributing to each and every one of these problems.

If nothing has drawn this to our attention before, events of the past few months most certainly have. The crisis during July is perhaps the ultimate reminder. At the peak of the heat wave, Ontario Hydro was forced to ask its Toronto-area consumers to curtail the use of fans and air-conditioners, not because it was unable to meet the electrical load demand but because doing so required operation of the Hearn and Lakeview thermal generating stations. The extra stack emissions could not be tolerated in view of the already serious air pollution situation.

Throughout the province, acid rain is killing fish and wildlife, defoliating the forests and damaging our buildings. Smog is known to have severe effects on the human respiratory system, up to and including death, especially among the weak and the elderly. The greenhouse effect has already impacted on our food supply, our water resources and other sectors of our economy. Experts predict that the future effects of increasingly warmer climatic conditions will be catastrophic in many areas. And toxic heavy elements slowly poison us all.

Local 1568 believes that Ontario Hydro's planning strategy is badly flawed in not addressing future coal-fired generation realistically. Given all of the above factors and the existence of an excellent alternative supply option, major changes in the planning strategy should be adopted. We would recommend strongly that the older, less efficient coal-fired generating stations be phased out in the very near future. Those located in the most densely populated areas of the province should be at the top of the list. Newer coal-fired stations like Nanticoke and Lambton should be backfitted with the most efficient emission control technologies available on a priority basis. Further, these stations should be used to meet peak load demand only, not as part of the base load supply system.

Oil and gas continue to be a major primary energy source for electrical generation in many parts of Canada. Where petroleum resources exist, economic factors will undoubtedly force this situation to continue. In Ontario, however, this is not the case. Ontario Hydro rightly notes that our province has no significant petroleum resources. In addition, petroleum resources are far too valuable to our economy as transportation fuels and petrochemical industry feedstock to consume in electrical generation. No major role should be given to this fuel in our electrical system planning strategy.

Unfortunately, Ontario Hydro has made a large investment in the Lennox oil-fired generating station. While mothballed since completion, it was recently deemed necessary to utilize part of the Lennox capacity because of supply shortages in eastern Ontario. We do not believe Ontario Hydro should plan to operate this generating station except as an alternative source of supply in emergencies. The cost of generation is too great to permit its use for even peak load supply on an ongoing basis. A reasonable argument can be made, however, that in an electrical system as large as Ontario's, a resource such as the Lennox station can be justified as insurance in case of emergency. It should therefore be maintained in a condition to permit reasonably quick startup

with adequate fuel stockpiled for winter conditions.

Ontario has utilized its hydraulic resources extensively in the past. Unfortunately, there are few significant undeveloped resources remaining in the province that are economically viable. Geography and distance are overriding factors, given the present low generating costs of alternative sources such as nuclear stations.

Local 1568 supports further hydraulic development where this is warranted. Increasing generating capacity and efficiency at Niagara Falls obviously makes sense, as do several of the other smaller projects mentioned in the draft document. We would note, however, that hydraulic generation is subject to its own environmental problems.

Flooding large areas of land and changing the natural state of the few remaining undeveloped rivers will be resisted by many, particularly the native people in northern Ontario. The majority of our population in southern Ontario must realize that they can no longer ignore the effects on the environment, and on other segments of our society, that their demand for electricity produces. Moving the problem to someone else's backyard is no longer acceptable.

The so-called alternative sources of energy supply–solar, wind, and biomass–have been loudly touted by some self-styled energy experts. All of these sources are a long way from economic usefulness except in some very limited applications. Ontario Hydro rightly dismisses them from playing any significant role in its planning strategy.

Some situations exist in Ontario where an industry produces more electricity than it requires, or could do so by utilizing waste products. We believe it makes sense to feed the surplus into Ontario Hydro's transmission system for use in other locations. The only concern is determining an equitable price.

We do not believe Ontario Hydro should be forced into a situation where it must, by legislation or regulation, buy electricity from private producers. We are aware that some groups are promoting that philosophy, as documented in the record of the standing committee on energy, mines and resources of the House of Commons.

Our opposition is based on the fact that Ontario Hydro is charged with the responsibility of generating and supplying electricity to the entire province. Private industry or businesses have no such responsibility. Promoters of legislation forcing purchases of electricity by the public utilities maintain that the price should be determined by the cost of the production at the utility's generation stations. However, they ignore the costs associated with transmission, load management, etc., which could be significant, especially where the local transmission system is already heavily loaded. The reliability of these private generating sources is another concern. If problems arise, they can simply go out of business. Ontario Hydro cannot walk away from the problems; it must solve them. All factors considered, we believe Ontario Hydro is the most appropriate agency to determine what value privately generated sources of electricity might have for its customers.

Ontario Hydro has been negotiating with neighbouring provinces for the purchase of large blocks of electricity on both an interruptible and a firm-supply basis. As we understand it, indications are that Manitoba, because of the recent events, has little to sell at any reasonable price. Quebec, on the other hand, has plenty and will have more in the future if James Bay 2 is built.

We have been told, however, that the price they insist on is significantly more than Ontario Hydro's cost of generation. On an emergency basis, or to meet peak demand over the short term, such a price might be acceptable, but it is not acceptable in the long term.

Ontario Hydro's mandate from the province is to supply electricity at the lowest possible cost over the long term. That mandate has been supported consistently by the people of the province for several generations. We do not believe that this mandate extends to long-term purchases of electricity from other provinces when the same electricity can be generated more cheaply within the province using Ontario expertise, resources and skilled workers. Ontario has the capacity and the knowledge to do this, and we believe Ontario Hydro has the duty to carry it out.

Mr. Cox: If you look at the nuclear option, it was recognized long ago that Ontario did not have adequate energy resources within the province to meet future needs. Ontario Hydro and the government of Ontario at the time made a farsighted decision to explore nuclear energy as a future energy resource. In co-operation with Atomic Energy of Canada Ltd., this goal was attained with the development of the Candu reactor system. Both from operating experience and through the many exhaustive investigations of nuclear energy over the past 10 years, the Candu record as a safe, reliable and economic

:lectrical generating source has been clearly :stablished.

1140

Recently, as concerns over the environmental :ffects of fossil fuel combustion have reached iear-crisis level, a realization of the minimal :nvironmental effects of the Candu nuclear eactors is emerging. Even former nuclear critics ire revising their opinions. Public opinion polls iave indicated a widespread awareness that iuclear energy is a reality for the future that one ve can live with comfortably. Why, then, does his option seem to play so little a role in Ontario Iydro's planning strategy for the future?

The reason, we believe, is hesitation on the iart of elected provincial officials. Aware of the ttention given to highly vocal nuclear critics by he media, the politically safe thinking for some ime seems to be to demand another study. Aeanwhile, Ontario's electrical supply system nargin is running out. The draft document, in ection 6.1, clearly shows existing and commit-:d generating capacity falling below the most robable load forecast in 1996, only seven years rom now; and we believe there is evidence that)ntario Hydro's most probable load forecast stimate is low. There is little time left to make he necessary decisions to avoid this shortfall.

Given the long lead time required to plan, onstruct and commission large multi-unit Can-u generating stations, very serious consider-tion should be given to the Candu 3. This is the ew 300-megawatt design developed by AECL. Construction time is estimated to be in the order f four years. A two-unit generating station using ie Candu 3 would ideally bridge the gap while onger-term strategy elements are put in place.

The site for such a station is also easy to :solve. Eastern and northeastern Ontario are hort of electrical supply now, the main reason ie Lennox thermal station was reactivated. An ption to buy electricity from Quebec for this rea at peak load times has already cost Ontario ydro $10 million. Actual purchases will cost ven more. The upper Ottawa River is an ideal te to locate this new generating station. ufficient cooling water exists in the reservoir ehind the Des Joachims hydraulic station dams. ntario Hydro owns some land in the area, and e local area is supportive of the concept.

Transmission lines exist from Des Joachims to oronto and to northeastern Ontario. A new line ould be required to the Ottawa area, but for the ost part this can be routed through undeveloped ountry. All the elements exist to allow a speedy id a logical decision to be made. We believe this should be an early priority in Ontario Hydro's planning strategy.

Additional benefits would be realized by Ontario through supporting the Candu 3. As the site of most of the Canadian nuclear industry, the province stands to profit from demonstrating this new AECL reactor design. It is designed to meet the requirements of smaller countries, where electrical systems cannot easily adapt to the output of larger reactor units. It also can fit into larger systems when small, incremental increases and supply capacity are needed. As such, it represents the reactor design expected to be in most demand throughout the world for the next decade. Canada can win sales in this market, particularly if a working Candu 3 can be demonstrated. Those sales will benefit Ontario.

Canadians have long had a reputation for caution in promoting their own accomplishments. The Candu reactor is certainly an example of this. Despite being recognized as one of the top 10 engineering achievements in the past century, many Canadians continue to ignore it in favour of imported technology or traditional generating options. However, the province can no longer afford to do this. From the standpoint of the environment, economic competitiveness and our own future needs, Ontario must adopt the most attractive electrical supply option available to it. The Candu reactor system is the one. Ontario Hydro's planning strategy must recognize a greater role for nuclear generation or else it has no strategic value.

We look at demand management. This major component of the draft document and recent Ontario Hydro activity is a problem to us in several ways.

First of all, although it is obviously aimed at reducing future demand growth, the concept is called a supply option. We do not believe it can be both. The reason is that any action taken to successfully reduce demand represents a once-only gain. Demand load drops to a new lower level but proceeds on from there. The same action can no longer be utilized to affect it. A true supply option, however, once in place, continues to produce electricity for as long as it is in operation. For this reason, we are somewhat dubious about the long-term benefits of demand management as a supply option.

As a load-reduction concept, demand management has some positive features. Certainly, increasing efficiency of electrical devices, levelling peaks and valleys on the load curve and encouraging energy conservation awareness in general are all desirable goals. The danger is in

how these are accomplished. As union officers representing some members working on a shift schedule, we are not unaware of the problems shift work entails. Forcing many Ontario workers on to a shift schedule from daytime hours simply to level electrical load is not an action unions would quickly support. There are too many hidden personal and social costs involved.

Similarly, strong pressure to change work and home life activity patterns could be unproductive. People resist change if no significant benefit is perceived. Actions designed with this in mind must be carefully approached and implemented to gain acceptance.

Even if Ontario Hydro sees benefit from time-of-use rates, for example, consumers must see benefits also. Most of us in Ontario do not deal directly with Ontario Hydro, but with our municipal utilities. As we understand it, Ontario Hydro has not always been receptive to consumer concerns in the past, and demand management plans may suffer from these experiences.

Overall, Local 1568 believes the impact on demand, from demand-management concepts contained in the draft document, is too optimistic, particularly in the short term. We suggest significant effects from this strategy component will be lower than anticipated during the 1990s and should be discounted until some results are evident.

Planning strategies for transmission facilities are heavily affected by decisions on future generating sites and anticipated load concentrations, as well as by demand growth. As Ontario Hydro has found, to our cost, they are also seriously impacted by public acceptance. Therefore, the factors mentioned above must be resolved first as much as possible.

Despite this, some serious shortcomings do exist and must be corrected. Locked-in power at the Bruce nuclear station is a serious and expensive problem. There are possible solutions outside Ontario Hydro's control, however.

The provincial and municipal governments should take a much more aggressive role in encouraging industries to locate near the electrical energy source. If locked-in power is needed locally, the pressure to complete lines out of the area is reduced.

Eastern Ontario and northeastern Ontario are also affected by transmission system limitations. Here, however, the problem is insufficient line capacity into the area, not out. Such limits hamper efforts by all levels of government to attract industry to these areas and should be corrected as soon as possible. Locating more generating capacity in the area would help, ar as we suggested earlier, the upper Ottawa Riv is an obvious site.

Before concluding these comments, we wou like to bring to the select committee's attentio recent event that strongly indicates the change attitude towards nuclear energy in Canada. some of you may know, organized labour has n always been strongly supportive of the nucle industry in the past. The policy statement energy approved by the delegates to the 19 convention of the Canadian Labour Congres for instance, called for a comprehensive publ inquiry into all of the implications of proceedi with further nuclear power development. T policy stopped short of calling for a halt to furth development of nuclear energy due to the seve repercussions this would have on the 85,0 direct and indirect jobs the nuclear indust sustains.

1150

This past spring in Vancouver, the delegates the 1988 CLC convention approved a mu different statement on nuclear energy in a ne energy policy paper. This statement contains clear recognition of the success of nuclear ener in Canada and, in particular, Ontario. We quo sections 41 and 42 of the statement here for you

"The use of nuclear reactors to genera electricity in Canada is a product of research a development by a crown corporation, Atom Energy of Canada Ltd., and the decision Ontario Hydro to utilize this technology. T Candu reactor is a uniquely Canadian achiev ment which, by international standards, h demonstrated an enviable record for safe, rel able and efficient operation. At the present tim three provinces–Ontario, Quebec and Ne Brunswick–have nuclear power capacity. N tionally, nuclear power accounts for 15 per ce of electricity generated; in Ontario, it contribut a very significant 47 per cent (1986 figures).

"The Candu technology ranks very high terms of Canadian content. Over 90 per cent the equipment, materials and labour required build and operate a Candu station is sourced Canada. We have, additionally, domestic cap bility in the mining, milling and refining uranium, fuel fabrication and heavy wat production. Some 100,000 jobs are directly an indirectly dependent upon the nuclear industr many of them held by members of CLC-affiliate unions."

Representatives from Local 1568 were prese at both the 1980 and the 1988 CLC convention and we can assure you that the above statemen

approved in the 1988 policy paper would not have been acceptable in 1980. We believe this is a clear indication of the change in attitude towards nuclear energy among the some two million members of the CLC, and half of these members are from Ontario.

In conclusion, we are pleased to have had the opportunity to present these comments on the draft DSPS document on behalf of the men and women of Local 1568 at Chalk River. As a union and individually, we are all proud of the Candu reactor system and of having been part of its development. We believe this remarkably successful Canadian achievement should play a much greater role in Ontario Hydro's future planning strategy.

The people of Ontario expect their elected officials to make the serious decisions necessary for our continued wellbeing. We believe they will support a recommendation from you in favour of nuclear energy as part of that goal.

Mr. Murphy: I realize we are perhaps running a little later than planned. I will not go through these extra pieces of information in detail. I would like to draw your attention to the very last one in that list, which is the yearly debt per plant, coal versus nuclear. I think there is very significant information on that chart, to which the committee members might want to give some serious consideration.

Mr. Chairman: Thank you very much, Mr. Murphy. I think you gave a very complete presentation here. Our time is up. I wonder if the members have any questions of clarification.

Mr. McGuigan: I compliment you on your brief. It is very good. I wonder why you would make the statement at the top of page 12, "The reason, we believe, is hesitation on the part of elected provincial officials." I would point out that this government has reregulated highway transport in the face of very heavy opposition from union members. We have introduced amendments to the Retail Business Holidays Act over very heavy opposition by union people.

Mr. Cureatz: Among others, I might add.

Mr. McGuigan: We have introduced French-language services and we have extended separate school funding, and none of these was without opposition. I sort of wonder why you put that condemnation in before the facts.

Mr. Murphy: I do not think we meant to imply that the present government is the only one. The previous government certainly had a similar attitude towards its last years.

Mr. McGuigan: With that, we will agree.

Mr. Murphy: And the federal government certainly is the same.

Mr. Cureatz: Wait a minute. I am not going to let him get away with that. If you want to get partisan, you are talking to Mr. Partisan right here. Let's talk about Sunday shopping and all the groups involved, the big unions, nonunions, big business, small business, the churches–

Mr. Chairman: Thank you, Mr. Cureatz. I wonder if we could perhaps limit our partisan tendencies here.

Mr. Cureatz: I have been behaving so far.

Mr. Chairman: We appreciate that very much.

Mr. Murphy, on behalf of the committee, I would like to thank you very much for coming in and presenting this very detailed and excellent brief to us. We appreciate your taking the time to come in and speak with us.

Our next witness is from the Bridlewood Residents Hydro Line Committee. I wonder if Mrs. Hunter is here. I believe we have a copy of a paper that is being distributed now.

Mrs. Hunter, we have approximately half an hour. We will run a bit late. I wonder if you might give us your presentation and then we will have some questions after if time permits.

BRIDLEWOOD RESIDENTS HYDRO LINE COMMITTEE

Mrs. Hunter: My name is Judy Hunter. I am president of the Bridlewood Residents Hydro Line Committee in my community of Bridlewood, Kanata.

My presentation to you today is based on Hydro's report 660SP entitled The Transmission Aspects of the Representative Plans, which is a reference document to the DSPS. That report outlines various options for supply and demand. These options will determine the extent of the development of existing and future transmission lines in the province.

My concerns are really threefold, yet they are intricately tied together. Briefly, the first concern is future power generation plans for Ontario. In the report, Hydro lumps conservation under demand and states that "price-induced conservation would eliminate the need for additional generation resources." I believe that conservation and alternative energy sources, such as cogeneration, should be actively promoted as a source of electricity for Hydro. This would reduce the need for further nuclear and fossil-fuel

burning megaprojects with their accompanying environmentally damaging side-effects.

Although I have deep concerns about the plans for future generation of electricity in Ontario from both an economic and an environmental perspective, I will now focus my presentation on my second concern, which is the transmission aspects of the future plans. Megaprojects, after all, result in the construction of thousands of kilometres of new high-voltage transmission lines with their own adverse environmental effects.

The report fails to seriously address the downsizing which could take place in high-voltage transmission line corridors if alternative schemes of energy production and conservation were chosen. When Hydro's report discusses conservation on page 15, it states, "In all cases, however, the transmission line reinforcements would be required."

Instead of looking at alternatives, the bias is towards ever-expanding the transmission line network across the province. The interests of the people in Ontario and the interests of Hydro have taken two distinctly different paths, paths which today are getting farther and farther apart.

The report discusses the environmental effects of the routing of high-voltage transmission lines, but does not address the growing public concern over the health effects of exposure to chronic EMF or electomagnetic fields of radiation which emanate from these power lines.

Hydro itself has been aware of the EMF health risks for many years. They maintain a $400,000-a-year, state-of-the-art library of recent and ongoing research papers. This year they announced their participation in a three-year, $3-million study on the health effects of EMF on their linesmen and the public, primarily children.

It is alarming that while worldwide research is ongoing and points to a positive association between adverse health effects and chronic exposure to EMF, Hydro fails to recognize this and continues to route high-voltage transmission lines through populated areas and next to schools. There are no laws imposed by the government to limit public exposure to both electric and magnetic fields or even to restrict transmission line placement.

1200

I first became aware of the health issue in September 1986, when the Ottawa Citizen ran an article about a symposium Ontario Hydro had held on electromagnetic field risks. For the past two years, our community has lobbied the government to seek a rerouting of planned high-voltage transmission lines away from th Bridlewood Junior School. Our group ha submitted to cabinet a number of reports on th health issue to support our contention that th new lines are a risk. Having been unsuccessful t date with our lobbying, we are now seekin expensive judicial review of the routing decisior

I will be happy to speak to you about the EM health issue and try to answer your question later. Since I have only a limited time to mak this presentation, however, I have put th background information on these concerns in th appendix. I believe the EMF issue reall deserves its own select committee hearings.

My third concern is about the process whereb the public is left virtually alone to face Hydro an the joint board when hydro line routings ar being considered and appealed. It is failing th people in this province. My community o Bridlewood is living and tragic proof that th process has failed. I do not exaggerate when I sa that we are a community whose faith i democracy has been deeply shaken. The childre of Bridlewood and Kanata have lost their faith i the government and its institutions. They se those in authority willing to put children's healt and wellbeing in jeopardy for reasons that the cannot understand.

Originally, back in 1984, we trusted Ontari Hydro. We were told by Hydro officials at a community meeting that the proposed high voltage line could not possibly go through ou existing corridor through the heart of Bridlewoo because the right of way was too narrow an technically unfeasible. We went home assure that the new line would not affect the existin community, where there were two school site planned.

Based on the assurances from Hydro, few residents participated in the subsequent hearing process, because we felt that the heart of the community was safe. The two routes debated between the city of Kanata and Hydro at the hearing were well south of the built-up area. You can appreciate the shock in this community when the joint board chose the technically unfeasible route that Hydro had said at the meeting would not be under consideration.

Kanata appealed to the government twice, asking that this gross error be corrected and our available alternative route be chosen instead. Hydro filed an opposing document which was filled with the most incredibly blatant lies and misleading half-truths. The Ministry of Health contributed an unsigned health review taking Hydro's position on EMF. The cabinet ruled

against our reasonable request. As a result, we have two rows of 175-foot towers, eventually to have two sets of 500-kilovolt lines and two sets of 230-kilovolt lines standing right beside an 800-pupil school.

Today, as the new lines are being installed, parents are anxious, disillusioned and angry. We are still trying to find the justice that the system has failed to provide. In successive surveys of the community, 70 per cent of parents state that they will definitely or probably pull their children from the school if the lines go in and are energized. Some have already done so by switching their taxes and children to the separate system or by moving out of Kanata.

Myself and my committee have spent the last two years working on a solution to this dilemma. The facts point to the need to route high-voltage transmission lines away from where people live, work and go to school. Unfortunately, it appears that the only people who have supported us in our fight to place controls on transmission lines are those who have no vested interest in maintaining the status quo. It is very easy for authorities to tune us out when Hydro adamantly states it cannot afford to follow a prudent course.

One obstacle to making progress lies behind the closed doors at 700 University Avenue. Hydro is unwilling to release basic information on its operations to the public. We want to learn Hydro's estimates of the EMF radiation levels under and beside the new hydro lines at the Bridlewood site. What are their projected radiation levels for the children at the school and how do they determine those projections? How do we get answers from our public utility?

Hydro's public relations people tell us to have our lawyer talk to their lawyer. Does this mean that anyone who lives in a hydro corridor who wants to know the level of radiation his family is exposed to has to get a lawyer to get some answers? Hydro's stonewalling is a scandal. What is Hydro hiding? Is it afraid of what the public would do if it learned some facts about the radiation levels and the resulting effects?

Our frustration is compounded by the techniques the Hydro public relations people use to try to defuse the issue. Whenever our concerns come up in the media, we hear warnings of blackouts and brownouts from Hydro officials. Residents feel cynical and bitter when this easy quip can be used to justify putting a whole community's health at risk, especially when an alternative exists.

Where does the community turn when politicians turn a blind eye and a deaf ear to our cries for help? Why do we have to prove a health risk when Hydro should have to prove its new lines are safe? Why do we allow the construction of high-voltage transmission lines through populated areas where there are narrow rights of ways and next to children's schools?

A child's death may not even be enough to push Hydro to change. Even if a Kanata child contracts leukaemia and dies, Hydro may tell us there is no conclusive proof that the Hydro lines were the culprit. Are we going to hear that it was the parents' choice to send their child to that school? How are the other parents and other children going to feel? This is the type of situation which can cause a violent reaction.

The growing concern for environmental hazards are here to stay, but we can do something about it. Instead of maintaining the status quo until a tragedy occurs, we can act prudently and make some positive changes on the basis of what is known about electromagnetic field hazards.

What are the risks to the public in Ontario? I will quote Dr. Robert Becker, from New York state, on risk:

"The truly important questions of our time are those relating to technology and its uses and abuses in relation of human beings. The public has a right to the relevant scientific information and cannot be denied the right to have a voice in decisions that affect their health, safety and quality of life. However, though scientists can provide the information, any scheme that calls for 'experts' to make decisions of relative risk tends to have little value. The only valid and ethical risk analysis must be made by those who are at risk."

The upgrading and construction of high-voltage transmission lines across Ontario resulting from new power generation will place many people at risk. These people not only need to have a say in determining routing, but also they need the government to institute some much-needed guidelines on Ontario Hydro so that people are protected when transmission lines are built.

People in this province do not usually have access to the kind of information I have passed to you today. During a joint board hearing, Hydro has never raised the issue of EMFs and human health as a guideline the board should use in decision-making. Hydro's report does not even list this health concern as a factor under environmental issues.

We have a double jeopardy in most provinces of Canada. The utility that is causing this health hazard is government-owned. You can say we

are fighting big business and the government at the same time. The people are left alone to protect themselves.

Authorities must look into the health concern in a careful, unbiased, scientific manner. After all, we would not ask the tobacco industry to fund and direct research into the issue of cancer and smoking. The government needs to fund a solid, independent body which will investigate EMF and the health risks. Any study co-ordinated by Hydro is subject to obvious questions of professional and financial bias. Since the results from truly professional studies continue to show a link between EMFs and cancer and other diseases, then the next step is to find ways to reduce EMF exposure to the public.

I realized early in the Bridlewood fight that this was not another not-in-my-backyard battle. I see a small community up against an unresponsive corporation and its army of public relations types, trying to protect corporate interests at all costs; I have seen other communities facing the same unresponsive and uncaring giant. I have seen over and over again a process where the public is at a great disadvantage when it tries to resolve disputes. I am fighting to get a process which protects the average citizen.

As MPPs, you are the people who have the opportunity to take the bull by the horns by changing the status quo. Why do I think you should? We must preserve the future for our children and grandchildren. This world is not ours to destroy for our own selfish interests. We really are only borrowing it from our children. What kind of a legacy on this growing health concern do you want to pass on to future generations?

1210

I have a few recommendations for reforms to Ontario Hydro which I will quickly run through.

1. I believe we should force Ontario Hydro to actively pursue energy conservation as a means of supplying electricity. A megawatt saved is a megawatt freed to be used elsewhere. Hydro needs firm targets for reducing electricity use.

2. Since Hydro cannot guarantee that its power lines are not a health hazard, Ontario must place controls on high-voltage transmission line routings with firm minimum right of way widths written into law for populated areas. There should be no further construction of these lines next to schools.

3. More money is needed for independent electromagnetic field research. The present Hydro study has a built-in bias, unlike the New York power line project which had a panel to screen participation to those without professional or financial bias.

4. Given that Hydro does not listen to the people on this issue and the government has so far shown reluctance to direct Hydro, a knowledgeable and competent body is needed to deal with disputes on Hydro line routings. At present justice is denied. The system pleases only Hydro but even it must be somewhat embarrassed by the attention given to complaints by angry citizens.

5. All transmission line routings should continue to be part of a separate hearing process given the very serious and complex review required. Hydro's suggestion in this report of a combined hearing lumping in both generating facilities and transmission lines is totally unacceptable.

6. The valid concerns of the people affected must take precedence over the corporation. After all, only the people can judge what is an acceptable risk.

7. Other jurisdictions are dealing with the issue of EMFs and human health. They are passing legislation to protect their citizens, and I would encourage you to examine what is happening in other states, particularly in the United States, in appendix 2. Conservation controls and further research should help reduce the EMF risk to Ontario residents. We can no longer sit back, do nothing and let the EMF producer, Hydro in this case, claim all is well.

Mr. Charlton: In your presentation you essentially accused Hydro of lying and misleading. There are some who would accuse you of the same thing. Perhaps, because we have not had the opportunity to run through all of the things you have set out in the appendix, you could just summarize briefly for us the things you have seen and the things you have learned which have raised the level of concern you express in this brief.

Mrs. Hunter: When I say we were lied to, I can certainly back that up with around 200 people who signed affidavits to that effect in my community, one being an alderman at large, a council member in Kanata.

We were told originally by public relations people from Hydro, as I said in my presentation, that the existing route would not be chosen. Then it turned around and the joint board picked the route and Hydro, which of course had the opportunity to call for a new hearing, did not do so and proceeded to use the route, even though it said it never would as it was too narrow and technically unfeasible and it went against its

stated guidelines which had been issued to the community.

I think the other part of your question, about the frustrations in the community–is that what you were asking me also?

Mr. Charlton: Partly about your frustrations but partly about those things that have led to the concerns around health, those things which to some extent you have probably set out in your appendix.

Mrs. Hunter: In the appendix I have set out reference to a lot of studies. I guess we felt that when the government reviewed this, a lot of the studies sent to the government were studies from Ontario Hydro. We were rather appalled at that. We wanted the government to look into this in an unbiased manner. That disturbed us.

We do not believe Ontario Hydro lied to us about the health issue. They agree there is need for concern, and that is borne out by the fact that they are embarking on a $3-million study into the issue. But I think that compounds the frustration in the community, the fact that Hydro is studying the matter and yet we are still having this huge transmission line located right next to an elementary school and very close to homes and to a high school site in the future; it is proposed for along the right of way.

There are those kinds of frustrations, not finding out the truth from public relations people and being told that you have to speak to your lawyer who has to speak to Hydro's lawyer before you can get basic information such as what the field strengths are going to be once part of this facility is energized. It is very, very frustrating. This is supposed to be my public utility, yet we are continually being told contradictory information.

Mr. Charlton: We have not yet had the opportunity to go through the appendix you have provided us with, but you referred in your presentation to studies which I guess have formed a part of your feelings and your fear around electromagnetic fields. You refer to the fact that Hydro is doing a study and that it is not appropriate to have a proponent doing a study. Have there been any significant independent studies of EMFs in Canada?

Mrs. Hunter: A Dr. Martin at the University of Western Ontario, whom I refer to in here, I believe has done some work showing genetic defects in chick embryos, but there really has not been very much work done in Canada. The majority of the research is being done in the United States.

I think you have to look at this as a very difficult area to research. It is an unfolding and emerging environmental concern and it takes different types of research such as epidemiological, combined with laboratory research. There have been some very good independent studies, such as the epidemiological studies in the United States, which have shown that children in an environment of higher magnetic fields have an increased rate of leukaemia and brain cancer.

Mr. Chairman: I would like to thank you for coming in and making this presentation. It is a very complete one and we appreciate your taking the time to come down to speak to us.

Mrs. Hunter: Thank you.

Mr. Chairman: I will adjourn the committee until 2 o'clock this afternoon.

The committee recessed at 12:20 p.m.

AFTERNOON SITTING

The committee resumed at 2:12 p.m. in room 228.

The Acting Chairman (Mr. Brown): We will now commence the afternoon hearings. The first presentation will be made by Ronald Dodokin, president, and David Carter, vice-president, of the Waterpower Association of Ontario. Gentlemen, will you come to the table, please, and identify yourselves.

WATERPOWER ASSOCIATION OF ONTARIO

Mr. Dodokin: My name is Ron Dodokin. On my right is David Carter. We are currently the respective president and vice-president of the Waterpower Association of Ontario. I am also assuming our submission has been received.

The Acting Chairman: I believe all members of the committee have your submission in front of them.

Mr. Dodokin: In the course of these and other hearings, Ontario Hydro has been challenged on a variety of issues by a variety of interest groups. So that there is no misunderstanding, we are another interest group. We have a particular bias–water power development. That is one of Ontario Hydro's most defensible supply options available. Having said that, we are also pleased to say we enjoy a productive working relationship with Ontario Hydro and those various ministries pertinent to water power development.

We wish this committee to understand that our representations and our submissions made to it are representations made by a group which has actual experience. We are not lobbyists, consultants nor speculators. We are an industry which is a manifestation of all the policies of current governments, past governments and Ontario Hydro and we are seeking to mature in an orderly manner.

Currently, we represent with our membership approximately 70 per cent of the parallel generation capacity which is connected to Ontario Hydro's grid; so we are a working association and have some insights about water power development. We have, as well, established in our association a standing technical committee which in the past six months has met on four occasions with Ontario Hydro, the Ministry of Natural Resources, the Ministry of Energy and selected invitees to deal with the current problems we encounter as a develope generator of water power resources.

We are pleased that as a result of that we ca report that the contract Ontario Hydro now refe to as its standard contract is an offspring of thos kinds of meetings and discussions, particularl with respect to the term of the contract, the bas rate that exists within the contract and the lende comfort that appears in those contracts. We ar continuing to deal with Hydro on other situatio which occur and have to be resolved within th contract framework.

We also have had a great deal of interrelatio ship with Hydro with respect to interconne requirements, and those have now manifeste themselves in a published document by Ontari Hydro for the benefit of the industry at large.

Power purchase rates, which are very close t our heart as they are to others, have even see some improvement as a result of our submission in that now we have five rate options in which t shelter. That has given us some comfort in th types of situations in which we find ourselves particularly site development. We hope fo further development in that area.

We have also had a considerable amount o input with both the Ministry of Natural Re sources and Ontario Hydro with respect to th release of sites, and that really is one of the mor fundamental shortcomings of this whole pro gram: the lack of sites available for development That seems to be a function of the process, th inability of the Ministry of Natural Resources t resolve a firm and final release policy that i accepted everywhere. As you know, we ar currently waiting for the policy now to b released which will deal with the release of site in various categories. We are also hoping Ontari Hydro will let us have access to some of thos reserves it maintains and has not developed; tha is an ongoing discussion with both Hydro an MNR.

We have also had meetings directed to th criteria which will be used for proposals t develop water power sites, either those invited b Ontario Hydro and the Ministry of Natura Resources. We are keenly aware that there are lot of misconceptions with respect to thi industry, but one of them is that this is an industr which anybody can walk into and develop an that there are great rewards to be found. W would like to dispel those myths now because it i a very technically demanding industry. We ar

concerned that in the proposal stage and in the bid stage there is not enough attention being directed to the competency of the proponent, to the technical qualifications of the proponent and to the engineering basis for the development.

There are other areas we have recently pursued with Ontario Hydro, among them, the so-called build-to-own transfer scheme, that is, the ability of the private sector to develop facilities which would have otherwise been but are not currently being developed by Ontario Hydro under an appropriate mechanism. Of course, the amendments to the Power Corporation Actare of some considerable interest to us. We, as a private sector activity, wish to see ourselves secured within this utility activity field and we hope that will manifest itself in amendments to the Power Corporation Act. It will allow us, as a private sector utility generator, to exist not at the whim of Ontario Hydro nor at the whim of governments as they come and go.

1420

There are some matters we now have to face because we are interconnected to Ontario Hydro's grid and deal in operations, maintenance, the transmission of generation energy and the distribution of it. We are getting into some fairly exotic areas with Ontario Hydro as they and we learn about this private interconnect with a public utility.

The purpose of my telling you that is to impress upon you and the committee that, despite what may appear to be a utility that is remote, monopolistic and isolated, there is, in fact, a relationship that exists with the private sector. We represent that relationship. We are not content with rates, as most people are not, and we have said simply that rather than challenge the methodology Ontario Hydro goes through to achieve the rate structure it does achieve, we ask a simple question: Why is the private sector accorded a discounted power purchase rate?

Having arrived at an accounting cost of power which is clearly spelled out to mind-numbing degrees by Ontario Hydro, why then are we given 85 per cent of that rate? Why should we not be worth 100 per cent of that rate, having displaced the capital investment Ontario Hydro would otherwise have had to engage upon in order to develop the facilities we are developing?

That is a question which has not been satisfactorily answered for us as an industry and as an association. We think it ought to be addressed and it ought to be addressed promptly, because if this activity has any real worth, it can only be encouraged if it is an economically viable enterprise. We do not do this as a hobby activity. We never intended it to be that.

With rates as they presently exist, we have given you a small example of that in our submission. The whole of this enterprise is very sensitive to rates. It is a capital-intensive activity. We are unlike most other businesses. We cannot decide whether we are going to be a success. If we then discover that we embark on it, we have to make our commitment up front.

Like the nuclear proponents you have heard today, we are an indigenous resource. We are also capital-intensive. We have other dissimilarities, but in that respect we are not unlike the nuclear activists.

In the course of this past year, having made submissions to the cabinet committee on economic policy, to the Ontario Energy Board and here before you, we have seen others asking for other forms of arbitration or mediation to exist between Ontario Hydro and the private sector, whether it be advisory councils or some other form of arbitration. Frankly, we are wary of that. We are so because in the short period of time this activity has existed, we find ourselves already being mired down in a lot of bureaucracy and a lot of regulations. The site release policy is one example, a site release policy that cannot seem to come to public view. After many, many drafts and many, many submissions, we still do not really have a site release policy from the Ministry of Natural Resources.

To use our own example again of our technical committee, we have successfully dealt with our customer, with the prime utility, on all the matters that count if you are in this business. If you intend to generate and interconnect to the grid, there are technical questions which have to be addressed as well as contractual relationships and economic relationships with respect to the rate, and we have managed to have a working dialogue with Ontario Hydro.

If there were someone else between us and Ontario Hydro, I am not sure the process would work any better and, frankly, it may work a lot less well than it does presently; so from our point of view, we would like to see the system become less rigid and more reactive. Those recommendations we see, for example, in the report of the Ontario Energy Board are ones that we do not necessarily subscribe to.

There is a fundamental need for anyone in this business, and that is long-term, fixed-rate financing. That is a very, very difficult and elusive goal and we are currently working with Ontario Hydro in order somehow to be able to

achieve that kind of financing. Hydro has been reasonably co-operative in that regard. That is the need and this industry is perceived by those on the outside as being a novel and interesting activity. It has a lot of defensible points about it and it is endorsed by all of the critical groups, but fundamentally, when a banker sits down to talk to a water power developer, his eyes glaze over and it is a difficult process.

That is the critical issue and that is where government and Ontario Hydro really have to encourage the industry by offering those kinds of comforts or supports. We are not talking about loan guarantees or that sort of thing, but assurances to the world at large that this is an activity that we have not just invented most recently and that it does have worth and it does have real, practical consequences.

We are interested, therefore, in leaving you with the impression that we are a serious group. We have an association that runs across the spectrum of generators, developers, manufacturers and engineering groups and we are all trying to act upon the initiatives that have been given to us, both by the government and Ontario Hydro. While we may all come to these kinds of hearings and sessions and tell you what our complaints are, the fundamental fact is that if it is to happen, it has to happen in an economic arena.

Ontario Hydro controls that element in its rate structure. Government controls the other aspect in how the site is released for development and how all of the various ministries of government understand what this process is all about.

I might tell you from practical experience that it is not always a congenial and friendly field out there. There are some bureaucrats in various ministries who view this thing as an adversarial process and we are just one more target. I am sure that was not the original intention of the government or Ontario Hydro when they set about creating a parallel generation policy. Unless you want to abandon it entirely or see it wither on the vine, I think it is important that you now act and get to the fundamentals: the fundamentals of rate, the fundamentals of site availability and the fundamentals of the regulatory process.

We have seen all the things that can happen to one in the United States. We have all said we do not want to duplicate that sort of thing here; yet, slowly and slowly, we are attempting to do that very thing. It is a mistake.

From our part, we think the water power option may not be the total supply option available to Ontario Hydro in terms of capacity, but it is one of the most attractive and it ought t[o] be encouraged rather than discouraged.

We invite any of your members to as[k] questions of us. Hopefully, we can answer som[e] of them.

The Acting Chairman: Thank you very muc[h] for your presentation. Some of the members hav[e] indicated they wish to ask questions, but I migh[t] tell you before we begin that in my riding w[e] have a number of water power projects unde[r] way, one not more than a mile from my home, s[o] I am quite familiar with a number of you[r] problems and successes.

Mrs. Stoner: I have some basic informatio[n] needs here. First of all, how many active privat[e] sector water power projects are there in Ontario?

Mr. Dodokin: In the period 1981 to 1987, [I] think there were approximately nine megawatt[s] of capacity that were installed and that represented about an $18-million investment in tha[t] six-year period. In the period 1987-88 there wer[e] 60 applications filed under the Lakes and River[s] Improvement Act, which is the regulator[y] beginning for this enterprise. Of the 60, there ar[e] about 10 location approvals granted within th[e] last 18 months; that is, proponents who have [a] consent to proceed. Of those 10, there is on[e] works approval granted; that is, a proponent wh[o] has met the engineering requirements and i[s] actually developing.

1430

Mrs. Stoner: Not producing?

Mr. Dodokin: This project will be complete[d] at the end of December. It will then be connecte[d] to Ontario Hydro's grid and produce. What I am saying to you is that 10 per cent of the curren[t] location approvals that are outstanding are unde[r] way.

Mrs. Stoner: Are you saying there are non[e] now producing?

Mr. Dodokin: Oh yes, there are a variety o[f] demonstration sites, which I am sure you ar[e] familiar with. There are sites that are so-calle[d] private sector sites that will bid on ministr[y] facilities; those are the Hurdman dam on th[e] Mattawa River and Burk's Falls on the Magnetawan River. Galatta is the third one. Those thre[e] facilities exist and they have a total capacity o[f] just under a megawatt.

Mr. Carter: Galatta is a megawatt and Burk's Falls is about a megawatt–

Mr. Dodokin: So there are 2.5 megawatts. That is what exists currently.

There is a project that is being constructed now that is 6.5 megawatts on completion. There will be three projects that will commence and be completed at the end of 1989 that will produce seven megawatts of capacity. There are other proposals around at various stages of completion.

Mr. Carter: We have four megawatts installed.

Mr. Dodokin: That is right.

Mrs. Stoner: Perhaps I misunderstood your first statement. I understood you to say there were nine megawatts of capacity being produced now. Is that correct?

Mr. Dodokin: In the period 1981-87 there were nine megawatts installed and in the period 1987-88 there were proposals to develop approximately 270 megawatts and those are at various stages of maturity.

Mrs. Stoner: Have you any idea of what the long-term potential in production is?

Mr. Dodokin: In capacity? You have probably read everyone's forecasts, as we have, and they range from hundreds of megawatts to thousands of megawatts.

Mrs. Stoner: What is your view of it?

Mr. Dodokin: I think probably there are thousands of megawatts. Having said that, they exist in areas where transmission may not be readily available or may be expensive to install, in which case the price of power will have to rise to the point where it becomes economically viable to develop those resources; or they exist in resources that are currently under Ontario Hydro's control and for one reason or another the private sector is not able to develop those resources or utilize them. Or they exist in Ministry of Natural Resources sites that have not yet been released for public bid for a variety of reasons also. So it is there. The short answer is, if the process were neater, they would be available.

Mrs. Grier: I am very interested in your submission and I wonder if you would comment on the amount of potential that is included in DSPS. I think they say 200 to 400 megawatts from small power.

Mr. Dodokin: As we have indicated, there are these applications that are current that total 271 megawatts and that, I am sure, is what Ontario Hydro refers to within that number.

Mrs. Grier: Presumably that is based on the existing buyback rates. If the buyback rate was changed to reflect what you are requesting of us, is there greater potential?

Mr. Dodokin: Of course. There is no question about it, because only certain sites can be developed under the present rate structure and if you take a look at that little example we gave you of what happens when you adjust rates, you can see very quickly that some projects would go and others would not.

In other words, I guess the short answer would be that if you can develop a site at less than $2,000 a kilowatt on the present rate structure, and there is sufficient capacity, and that would be something on the order of five megawatts, you could probably bring a project on and arrange financing for it. If you were content to sit through the long term, you would end up with a viable development.

But that has some parameters that are limiting, of course. If the rate were increased, even from the 85 per cent of the accounting costs, providing 100 per cent of accounting cost of power, you would see a remarkable activity taking place because now those sites, which would not otherwise have been developed, could be.

Mrs. Grier: Could you give an estimate of how many megawatts there might be, assuming some changes in the rate?

Mr. Dodokin: That is 50 per cent of the equation. The other part of the equation now rests with Ministry of Natural Resources which now must release the sites. For example, one of the things we have suggested to the ministry is that it really does not achieve any goal when you release one site every six or eight months, because what happens is that the industry at large has to make a decision as to that particular site.

Everybody rushes to bid on it because they do not know when the next one is going to be available. The more sensible way to do it, we think, is that if between Hydro and the Ministry of Natural Resources you approached a watershed that had existing development potential and you then decided how many sites existed on that watershed and put that package out for bid, you could bring a great deal of capacity on in an orderly manner.

It would all make sense from the point of view of Hydro having to achieve transmission capability to handle that power and from the point of view of the regulatory process getting to view the process and to deal with all of the various issues that come up. If that existed, in conjunction with an agreeable rate, I think you would see very quickly certainly hundreds of megawatts brought on stream.

Mrs. Grier: I am not familiar with the process or the criteria or the reasoning behind how the

Ministry of Natural Resources now does it, so it would be helpful if perhaps you could fill me in a bit on that.

Second, what about environmental assessment of private sector projects? Have you hitherto been exempt from the Environmental Assessment Act? What kind of an assessment is done by the Ministry of Natural Resources before it releases the site? If you were placed under the Environmental Assessment Act, what would that do to the equation?

Mr. Dodokin: There were two questions. I will answer the second one first. In so far as the Environmental Assessment Act goes, yes, we are subject to it in the sense that when a site is submitted for development, the district within the Ministry of Natural Resources has the option to decide whether that has either a minor or a major impact. If it is major, then it is referred for environmental assessment. If it is deemed to have a minor impact, then it is not and you proceed at that point. That is not to say, however, that anyone at any time can ask the Minister of the Environment to designate the site for an environmental assessment for whatever reasons exist in what are site specific concerns. That may very well take place as well.

So that we do not leave the wrong impression, we are not advocating or suggesting, and never have, that we ought to enjoy some special status within the realm of environmental assessment. If a project is environmentally objectionable, then two things have to happen. It either does not go ahead or it resolves the objections. I think that is fair. Nobody proposes that it be any other way.

In so far as the process is concerned, it currently exists that the Ministry of Natural Resources says that anything up to five megawatts, that is 5,000 kilowatts in capacity, is dealt with on the basis that whoever finds that site, assuming there is no dam or whatever–that it is a so-called virgin site–they, meeting all the normal requirements, can develop that site without the necessity of having it submitted to a public bid.

If it exceeds the five-megawatts capacity, then it must be put through the bid process. That invariably takes in, as well, all of the sites over which the Ministry of Natural Resources has an interest. Those are the ones with control structures–dams and so forth.

So really the tap is in the Ministry of Natural Resources' hands, if sites are to be released, if that is where they come from. Only in some rare instances will you find sites that are less than five megawatts that have no control structures and therefore can be proceeded with without bid. That is how the process works. There a approximately 12 pieces of legislation that eac and every developer must comply with in order develop a site, including the environmental law

1440

Mr. Richmond: In your description of th process, whether it is the short or the long rout can you provide a rule of thumb? How long do it normally take, assuming you get the wat power rights, to bring a project to fruition whe you are providing power into the grid?

Mr. Dodokin: If you are given locatic approval, you are normally given approximate 12 months in order to proceed through to yo works approval. The works approval is, course, the submission of all of your engineerin drawings of how you propose to develop the sit That is a function of engineering: How long takes to develop and design the concept? Th more exotic the proposal is, obviously, th longer it takes. Theoretically, once you are give location approval, you should be able to arrive works approval within the year. At that poin you then have the construction in your concern

Assuming that in the year you have proceede to works approval, you have also designed th specifications for your various contracts, yo would bid those contracts, they would b awarded within a reasonably short period c time, and construction would start. Our ow personal experience is that if you start a projec you should be able to finish it within a 12-mont period. It takes at least that long, howeve because you have to consider that a machin manufacturer has to build a turbine, and that i usually a 10- or 12-month interval, and there ar onsite things.

Mr. Richmond: You are up to at least tw years now.

Mr. Dodokin: Three years. This is typical.

Mr. Richmond: Does it vary with the size?

Mr. Dodokin: Sure. If you were to develo the Magpie, as Great Lakes Power is doing, tha certainly is going to be a long-term project, or th Little Jackfish, which Ontario Hydro proposes t do. Those are not small, inconsequential pro jects. But if you were to do one specifi development of, say, five or 10 megawatts, tha is typically the time frame you should operate in.

Mr. Charlton: You mentioned during th course of your presentation that you achieve five rate options. I wonder if you can expand o that a little bit for us and, as well, if you ca comment on your view of the question o

standard contracts and how you see that fitting into the whole process.

Mr. Dodokin: With respect to the rates, there is, of course, the so-called published rate, standard rate. That is the rate that is set annually for at-will power, and it is currently 3.76 cents. That is on the assumption that you achieve a 65 per cent capacity factor. If you fall below that, then you are penalized, and you are awarded currently 2.54 cents. That is the standard rate.

You can also opt for what is called a levelized rate, which then means that, in effect, you sign an agreement with Ontario Hydro to deliver power at a rate of 4.94 cents for the entire 10-year term, a flat rate for that entire period.

In addition to that, there are things called seasonal and time-differentiated rates; that is, winter peak off-on, summer peak off-on, daylight, night delivery. In fact, although that is a third option, there are four variables in there. In those instances, there is no capacity factor. In other words, for whatever you give Ontario Hydro into the grid at those particular times within that rate structure, you get the rate that is established.

By the way, you can mix that. You can have a levelized rate and you can opt out of that levelized rate to go into the seasonal and time-differentiated arrangement on a one-year basis in an effort to determine whether your particular site is better suited to that kind of a rate structure. Ontario Hydro will let you do that.

Then, of course, Hydro will negotiate a contract, contracts that are over five megawatts that have some inherent qualities with respect to capacity and whatever. You may negotiate the rate, and the rate is whatever Ontario Hydro deems it to be worth to it. Those are the variables.

Mr. Charlton: The second part of the question was the contract.

Mr. Dodokin: Yes. The standard contract has value to the industry at large, because what it does is put everybody on a level field. You know that the guy who signed a contract the day before you and the one who will sign it the day after are essentially signing the same contract, so you do not have to be any better than the other fellow in order to get a better agreement. That is one thing it achieves.

But the standard contract is more than that, because Ontario Hydro has really started this process by taking an agreement which was essentially, I guess, a selling agreement and turned it into a buying agreement. So there were a lot of anomalies in there that had to be worked out.

That is the process that has been ongoing. In the sense that there ought to be an agreement that you can look to Ontario Hydro for with some certainty and consistency, I think it is important to have that. The rates, obviously, will be as they are to the site you develop.

Mr. Charlton: When you refer to a standard contract, you are talking about a common set of terms and conditions–

Mr. Dodokin: That is right.

Mr. Charlton: –and not necessarily referring to rate?

Mr. Dodokin: No, no, it is a fundamental term. The contract or rates will be what they are in your particular instance.

Mr. Runciman: I just wondered how the gentlemen would describe the state of their industry today. I know you mentioned something about withering on the vine. I wonder if that would be an apt description for its situation currently.

Mr. Dodokin: While we are generating some electricity, we may not be generating an awful lot of excitement, because there are very few players in this industry. There is probably something in the order of 30 or 40 developers and there is a mix of engineering groups and peripheral support groups.

Currently, there is one site under construction. There are the ones I mentioned to you that have already been connected to the grid under this parallel generation policy, there are numbers that are being talked about and proposed and we do not know where they will end up, but if this has real worth to everybody–I keep going back to that statement–then something has to be done to encourage it, beyond simply policy, beyond public statements, beyond the handholding that has gone on heretofore.

What has to happen is that serious rate considerations have to be undertaken and sites have to be made available. All the interest in the world will not develop water power unless the site is there to develop. Those sites that are within the control of the Ministry of Natural Resources or Ontario Hydro clearly cannot be developed unless we have access to them.

Mr. Runciman: So you would rate rates as your number one priority.

Mr. Dodokin: It is fundamental to this whole process.

Mr. Runciman: You mentioned the–I do not know if it is avoided cost or what the terminology is.

Mr. Dodokin: Accounting cost of power?

Mr. Runciman: The 100 per cent, and you were allocated 85 per cent, I guess.

Mr. Dodokin: That is right.

Mr. Runciman: What is the rationale that Hydro gives you during your negotiations with respect to that?

Mr. Dodokin: For that differential?

Mr. Runciman: Yes.

Mr. Dodokin: They say they have a cost that is associated with transmission and distribution and monitoring and metering and that sort of thing. I do not know whether that is worth 15 per cent or not as a discount. But nobody says a great deal about the fact that if we spend $10 million bringing on a five-megawatt plant and it produces 35 million or 40 million kilowatt-hours a year, it should be clear to everyone that Ontario Hydro did not have to spend $10 million doing that in order to get those 35 million or 40 million kilowatt-hours. That ought to be worth something, and what we are saying is that it ought to be worth at least 100 per cent of what you call the accounting cost of power.

Mr. Runciman: You say nobody mentions this. I am sure you mention it.

Mr. Dodokin: We try, but we are only one voice in the wilderness.

Mr. Runciman: There is no positive reaction, obviously.

Mr. Dodokin: There is no positive reaction in so far as no one has given us the 100 per cent of the accounting cost of power; but yes, we have said it before, sure.

Mr. Runciman: You talked about the undeveloped Hydro reserves that could be released, as well as the reserves that fall under MNR. How significant are they?

Mr. Dodokin: In capacity?

Mr. Carter: During the Porter commission in 1977-78, they had allocated 17 sites in the province with installed potential capacity of about 2,400 megawatts. These were under the auspices of Ontario Hydro and these were deemed to be the best of the developments. That is not taking into consideration some of the major northern rivers that probably at this point in time would not be economically desirable.

Mr. Runciman: Since 1977, none of those 17 sites has been developed?

Mr. Carter: No.

Mr. Runciman: What is Hydro's reaction to your request to have those placed in your hands?

Mr. Carter: I guess it is the mechanism on the release. This is the flexibility that Hydro probably requires within the Power Corporation Act to allow the possibilities of build-to-own transfers or build-to-operate transfers–which is a World Bank concept for site development, primarily in Third World countries, Turkey being a prime example of this–in which a developer would come in and build a site.

Ensuring that the site and the technical competency of the development were sound, he would also operate the site for a period of time and then transfer that site back to the state at a predetermined price. That would go out to a competitive bid process, obviously ensuring the viability of the site.

1450

Hydro developments under Ontario Hydro's depreciated value is something in the neighbourhood of 80 to 100 years. If you are looking at a site that you would own and operate for a 20-year or a 25-year period, you are really taking it through the years at which it is probably going to give you the biggest headaches. When it is transferred over, you are probably going to end up with a site that everyone knows and has a working understanding and knowledge of as to how that site is operating.

Mr. Runciman: That sort of formula is unacceptable to your industry? That is what you are saying?

Mr. Carter: The formula?

Mr. Runciman: In terms of your saying that after 25 or 30 years you would be turning it over to Hydro.

Mr. Carter: It would probably be an interesting exercise to review. I think that is possibly the way larger site developments should take place in the province. Ultimately, the province is the beneficiary of the development. Presently, the developer has clearly demonstrated that he has an understanding of developing sites, sometimes at a lower cost than Hydro. Therefore, there would be a benefit to the consumer.

Mr. Runciman: I am still not sure if I understand why that has not happened in at least one or two sites.

Mr. Carter: Why it has not happened, I take it, is that Hydro to date has not had an opportunity to fully explore this option.

Mr. Runciman: Since 1977?

Mr. Carter: The build-to-own transfer option is something relatively new. The 17 sites Hydro reviewed during the Porter commission and the

select committee review were sites Hydro had as part of its inventory. They had looked upon these sites as having varying stages of development, 1982, 1985 or whatever, Little Jackfish being one of those sites.

Mr. Runciman: Is Thorold one of those sites? I read something recently about it.

Mr. Carter: Thorold is a development that is being done presently by the St. Catharines Hydro-Electric Commission on the Welland River. That is not one of Hydro's reserves. These would be the Mattagamis and the Niagara extensions, Little Jackfish, the Abitibis.

Mr. Argue: Coming back to the demand-supply planning strategy, I wonder if you have reviewed the strategy elements dealing specifically with independent generation and whether you have any comments on the elements in Hydro's strategy?

Mr. Carter: Yes, we have reviewed them. Although the demand/supply options strategy obviously promotes the renewable resource option, I believe it also looks upon it as being a very small option, or small in the overall scheme of things, but that does not take into account some of the larger site development.

We are a water power association and not a small water power association. We are looking to the future of provincial development. Although we believe that the report is pro water power, it is going to require more attractive economics to make it happen. It is a function of economics.

Mr. Argue: Looking at one specific strategy element, there was some discussion before the committee concerning Hydro's proposal for bidding on projects above five megawatts, basically that Hydro would communicate the need for independent generation and then would request proposals to contribute to that need and complete that by negotiating detailed terms and conditions. I was wondering if you had any comments on that vis-à-vis your comments on standing contracts earlier.

Mr. Dodokin: I just want to say that the contract element may not be entirely relevant to that process. The bidding process, whether it exists within the Ministry of Natural Resources or Ontario Hydro, is not a disagreeable process.

I guess the concern, as I initially mentioned it to you, is that the review committee, however that review committee is set up, at least has to afford an opportunity to those bidders to know which elements are being given the most or least weight within the bid process. I guess we all want to be comfortable with the fact that the technical competency of the proponent and the engineering value of the bid is being seriously considered. To be quite frank with you, that is a concern we have had in past bid situations, where other elements appear to be more predominant than the fundamental engineering aspect of this process. This is not, after all, an architectural endeavour; it is not anything other than an engineering endeavour and it ought to be given the serious weight it deserves.

The Acting Chairman: Thank you, gentlemen, for a very enlightening presentation. It is something the committee has heard a little bit about before and I am sure you have raised some important questions for us to think about.

Mr. Dodokin: Thank you, Mr. Chairman.

The Acting Chairman: I will now call on Don Lawson, who is the president of Candu operations for Atomic Energy of Canada Ltd. Welcome to the committee, Mr. Lawson.

ATOMIC ENERGY OF CANADA LTD.

Mr. Lawson: Mr. Chairman, ladies and gentlemen, I would like to thank you for making a place in your schedule this afternoon for Atomic Energy of Canada Ltd. Our reason for requesting the audience was really threefold. First, we would like to tell you what we see as going on in Candu outside Ontario; second, to provide some information on our decommissioning experience, and third, to give some information on waste management.

Before beginning the presentation, I would like to introduce my colleagues here. Joel Liederman is the general manager of our Montreal office and he also manages our decommissioning programs. Earlier this year he was appointed vice-chairman of the international decommissioning technology exchange program of the Organization for Economic Co-operation and Development's Nuclear Energy Agency, and he has recently presented seminars on decommissioning as an invited guest of the Chinese Ministry of Nuclear Industry.

Dr. Ken Dormuth is director of the geological and environmental sciences division at AECL's Whiteshell laboratory in Manitoba. He has been involved in the waste management research program there for the past 10 years.

AECL now comprises two entities: first of all, the research company, with its broad research programs at Chalk River in Ontario and also at Whiteshell in Manitoba, and second, the company that I run, Candu operations, which is responsible for designing, marketing and implementing Candu projects. Candu operations is

largely based in Mississauga, with a team of about 1,000 employees.

In addition to the 16 Candu units that are operating in Ontario, we have Candus in operation in Quebec, New Brunswick, Argentina and Korea. All of these are working quite well. Under construction, of course, there is the Darlington project, and at the same time there is the Cernavoda reactor in Romania, where there are five units under construction at present. The overhead we have there shows four of them under construction, and as you can see there, it is a fairly extensive construction site.

Although the construction at Cernavoda is being carried out by the Romanians themselves, something like $480 million worth of Canadian equipment and services, the bulk of which has come from this particular province, has been completed for the first two units. When the first stage of commissioning is reached at Cernavoda, we expect to negotiate contacts with Ontario Hydro for commissioning services there, and Ontario Hydro is providing and involved in the training of operators for this Romanian station.

Over the past year or so, we have really been focusing our attention on what is the future for nuclear power and for our own business, of course. Our findings are that we do see a definite future for Candu. Even when conservation and energy efficiency can be realized in a large way, we see that there is still a large and strong demand for electricity. I am talking worldwide here. The question then is, can nuclear compete with coal and can Candu compete with other nuclear systems? Our assessment is that Candu can compete successfully with other nuclear power plant designs and also with the coal-fuelled and oil-fuelled options.

1500

Offering great promise in the future is our newest design which we call Candu 3, probably previously known as Candu 300. We have called it Candu 3 because the figure 300 tends to be related to the capacity level of 300 megawatts of electricity, whereas in fact it is capable of producing about 450 megawatts. Similarly, the Candu 6 is not producing 600 megawatts but produces nearer 800 megawatts, and similarly for the larger unit.

The size of the Candu 3 provides us with some sound basis for optimism as more than about 80 per cent of all new power plants going into service between 1985 and 1989 have been dominated by sizes of about 400 megawatts. We see the Candu 3 as a key to achieving success in a number of selected base load markets, both domestically and offshore.

We are currently proposing a Candu 3 for the second unit on the Point Lepreau site in New Brunswick. Here, the competition is with coastal coal-fired units using relatively cheap imported coal. With fairly conservative predictions of future coal prices, we have a lifetime price advantage over coal of about 10 per cent if the coal unit is assumed to have no flue gas cleanup equipment to remove the sulphur. This economic assessment has been independently reviewed by both Toronto and New York bankers.

The market thrust for the Candu 3 design will be in provinces and countries having small grids or in more remote regions of larger countries and provinces, as well as in large countries where the major population densities are distant from the available electricity generating resources.

When we look at the future of Candu 6, we do see immediately that Romania and South Korea are likely to remain with this model. In addition to the Cernavoda site, the Romanians have firm plans for additional Candus at several other sites. South Korea, we believe, will in due course expand the Wolsong site by a further three units, which it has capabilities for, and there is a strong case to be made that these additional units will be Candu 6s.

Although localization and technology transfer are likely to be involved in these expansions, they will include Canadian supply and licence fee business, the bulk of which does come into Ontario.

There is also a strong potential Candu market in the Netherlands. The Dutch have recently conducted an extensive examination of the safety of competing reactor systems and Candu has come off very well in these studies they have conducted.

Turkey is still interested in a Candu program.

Japan is yet another strong potential Candu market. That country has already invested with us in studies of the role of Candu. In this case, our product would not be competing with other nuclear power plant designs. Rather, because of the complementary nature of the potential uranium fuel saving, it would complement their existing light water reactors. We see possible similar markets for the larger sized unit, also in Japan, as a hedge against the late arrival of their fast-breeder program. For similar reasons, we believe interest could in time be generated in the United States.

As a design organization, we cannot stand still and in fact we are not doing that. We are working

concertedly to come up with innovations to bring down the cost of Candu. A crucial ingredient there is a shorter construction schedule, an objective we are confident we can achieve. We see a construction schedule, for example–this is the actual site work for the Candu 3–to be something on the order of three years from first concrete to in-service.

As is the case with all power plant vendors, we are facing the problem of subsisting until the potential orders become reality. I thought you might be interested in hearing some of the efforts we are making to survive in this reactor order slump. It was recognized early in the slump that Candu technology is technology which can be applied in other areas and that is precisely what we are doing, using this technology to gain engineering service business.

Examples of Candu-related knowledge ready-made for use elsewhere is radiation detection expertise, safety and risk analysis capabilities and technologies in remote handling and robotics. Safety detection is useful, for example, in steel companies for monitoring scrap metal to show there are no active components in it. Safety analysis has been used by petrochemical plants in their work, and remote handling has been used in areas where it is difficult to reach normal tooling.

One of the prime achievements we have in the Candu design is very full control of the reactor and plant by digital computers. This has been able to be applied both in fossil-fired plants and in nuclear plants of other designs. We have in recent years successfully retrofitted these types of plants in Canada, the United States and Europe with some of our technology.

The list of our engineering services customers is growing but will only continue to grow as long as we are seen to have a sound long-term business. In our quest for Candu business, we are maintaining offshore presence in areas where we think there is most likelihood to get either services or Candu business. Currently, we have offices in The Hague, Zagreb, Bucharest, Seoul, Buenos Aires, Tokyo and the United States.

In AECL, we are fortunate to be able to offer the backing of the full AECL research programs which are conducted at the laboratories, and they are also trying to exploit their experience in other markets.

You can see we are not standing still. We are trying to keep abreast of the various developments, as we certainly have to. We are leaving no opportunities unexplored in our efforts to keep our team together, because we believe that we have a future, that we will be able to get the full support of all the involved agencies and that there will eventually be a second commercial phase for Candu business. A strong and unambiguous long-term commitment from Ontario would be a very strong plank in ensuring this future.

You have asked that we include in our presentation the subject of decommissioning, and I would like to turn to that now.

Decommissioning of a nuclear power plant means, as it does with any sort of plant, moving from an operating state into the out-of-service state. It includes assuring adequate health and safety protection both for the workers and the public, taking the right environmental decisions and complying with the requirements of the regulatory agencies.

We have found that the term "decommissioning" often leaves confusion in the minds of people outside the nuclear industry. Immediate word association with "decommissioning" usually is "dismantling." We see, and in fact there obviously is, a continuous spectrum of stages from just shutting down to complete dismantling of the power plant. International nuclear industry terminology has defined three discrete and not necessarily sequential stages or options for decommissioning which are described in the following set of illustrations.

We shall move from the operating station shown there, where everything within the red box is in operation, to stage 1 which shows the storage with surveillance. It has the characteristics shown there, with the reactor defuelled. The area in the red box is the area where most of the activity is maintained.

Stage 2 is sometimes termed "restricted site release," as it has the same aspects of the previous slide but has gone one stage further and has reduced the size of the components so you have the minimal physical security required there.

Finally, stage 3, called "unrestricted site use," is a return to either alternative uses or green grass conditions, as illustrated there.

Within AECL, we have a small group of decommissioning personnel who have developed quite a high degree of expertise. They have been working with that expertise around the world. We have experience now with the decommissioning operations at the Gentilly 1 reactor in Quebec, the Douglas Point reactor on the Bruce site and the small nuclear power development demonstration unit at Rolphton, Ontario.

The technology does exist to decommission a nuclear plant to any selected condition, from stage 1 right the way through to stage 3 and what

we have developed is a preferred, delayed-dismantling decommissioning scenario which starts with the static state, which is further than stage 1, so as to put the site into a condition at which it can be licensed as a waste storage facility and from which the annual maintenance and operations costs as well as the radiological risks to the public are in fact minimized. It incorporates the conditions you can see on this slide, and the proposal is that that static state will be followed, in something like 80 to 100 years time, by stage 3, or the site will be put to other use, such as building another power plant.

1510

The list of factors affecting the selection of the decommissioning scenario is a long one and includes such considerations as radiological protection, the health and safety of the people, planned use of site, costs, availability of decommissioning and waste handling technology, environmental and social considerations, national nuclear strategy, regulatory climate, land values and availability of commercial waste disposal sites.

The one big key we have with a nuclear site is that the main hazard, the radioactivity, decays with time. Among the first steps, while all the systems are still available and operating well, is the removal from the station of all of the easily removed radioactivity, items such as the fuel, the heavy water and the items within the filters. Then, while the systems are still able to be operated, the pumps circulate fluid through the system and flush the whole pipeworks system and then dry it. What you are left with is the induced radioactivity in the components and the corrosion on pipes, etc., which has some activity in it.

These procedures, plus the phenomenon of natural radioactive decay, do allow easier handling of components, especially those which had operated outside the main, highly active area of the reactor core. With our proposed plan, for example, the gamma radiation fields from components such as the steam generator and pumps and valves outside the core will be reduced to what is currently accepted as safe handling levels within about 30 years. More components will reach that status over the following years.

A decision to be taken early in decommissioning planning, then, is the choice of immediate dismantling or delayed dismantling. Our philosophy has been that as long as there is no immediate demand for reuse of the site, it is preferable and cost-effective to delay complete dismantling for something like 80 to 100 years. Through the perpetual radioactive decay already mentioned, the radiation levels from most of the short-lived isotopes become quite small after that time. This in turn means that less remote-controlled equipment will be required for dismantling, simpler tools can be used and there is less activity for the workers.

In addition, as radiation protection will be easier to achieve after 80 to 100 years, smaller work crews will be needed and there is a smaller radioactive waste volume to be dealt with. By that time, quite a lot of the waste could be classified as contaminated and can be disposed of once the rules are appropriately in place in what may be described as relatively conventional landfill sites.

The first large decommissioning job AECL tackled was the Gentilly reactor. This had been a 250-megawatt power station. Essentially now the station is in two sections: One section is completely decontaminated, is habitable and is being used by Hydro-Québec for administrative offices and for training facilities; the other section contains the remaining radioactive systems and equipment not dismantled. This is sealed and isolated in a static state.

Also incorporated in the Gentilly 1 decommissioning project was aboveground dry storage for the used fuel. This is housed in concrete canisters in a technique which was researched and developed originally at AECL's Whiteshell site. This static state achieved at Gentilly 1 reduced the maintenance costs there from what was approximately $10 million to a small cost for security guards.

At Douglas Point, on the Bruce site, the prototype station has been decommissioned to stage 1 condition and the fuel is also stored above ground in I think it is 47 dry concrete canisters. At Rolphton, the work is still continuing and the nuclear power development station will soon be isolated in a static state. The used fuel from Rolphton has been removed and will be stored at AECL's Chalk River site in concrete canisters similar to those used at Douglas Point. There are currently about 15 people on the Rolphton site, but by the end of the year the station will be monitored remotely from Chalk River, using visual surveillance systems and microwave telemetry systems transmitting any alarms that appear at that site.

Each stage of work that we have gone through is reviewed by the Atomic Energy Control Board and the appropriate licence is issued. Waste facility operating licences are in place for

Gentilly 1 and Douglas Point and have been applied for for NPD. Full documentation that we have submitted is on public view at the AECB reading rooms.

As have I said, our decommissioning expertise has attracted international attention and AECL has concluded bilateral agreements on decommissioning, co-operation and exchange of information with the United Kingdom Atomic Energy Authority and the United States Department of Energy as well as with Japan.

At the request of your staff, we have included in our presentation information on AECL's waste management program, and for this I would like to ask Dr. Dormuth to make his presentation.

Dr. Dormuth: At AECL we have been working on the disposal of radioactive waste to some extent almost since the beginning of Canada's nuclear program. When our company first determined that nuclear reactors could produce energy on a commercial scale, we also started to ask ourselves what could be done with the waste.

In the early 1960s, scientists at our Chalk River nuclear laboratories conducted the world's first experiments to investigate making a glass out of the nuclear waste and disposing of it underground. They successfully manufactured and tested this glass and found it to be highly resistant to the leaching of radioactive material in ground water.

About a decade later, the disposal of nuclear fuel waste, which is what we call the highly radioactive waste generated by the burning of nuclear fuel, began to receive greater attention than it had previously. By 1977, the government of Canada had commissioned a task force chaired by Professor Kenneth Hare of the University of Toronto to review the question of what to do with Canada's nuclear fuel waste. The task force recommended that Canada should study disposal of the material deep in the rock of the Canadian Shield.

Professor Hare's report led to a joint statement by the energy ministers of Canada and Ontario in 1978, in which it was agreed that the two governments would work together to develop a solution. Our company was assigned responsibility for a research and development program on the technology for packaging and disposing of the waste, while Ontario Hydro was given responsibility for continued storage of used fuel and for developing the technology for transporting nuclear fuel waste to a final disposal site.

The Ontario Legislature's select committee on Ontario Hydro affairs reviewed the Canada-Ontario nuclear fuel waste management program in 1980 and made a number of recommendations that led to a further joint statement by the two governments in 1981.

This second Canada-Ontario joint statement summarized the scientific progress to that point and established two important principles that are still in effect today: There will be a review, including a public hearing, on the concept for disposal; and there will be no site selection activities until the disposal concept has been judged acceptable by the two governments. At the same time, the federal government approved a 10-year research program.

This is a typical Candu fuel bundle used in Ontario Hydro reactors. It contains about 20 kilograms of uranium in the form of ceramic uranium dioxide pellets, which are highly insoluble under a wide range of chemical conditions. One fuel bundle is capable of producing the same energy as burning 400 tonnes of coal in a coal-fired generating station. Burning the coal would emit hundreds of tonnes of acid gas and carbon dioxide.

1520

In a reactor, some of the uranium atoms fission, releasing tremendous energy. In the process, about one half of one per cent of the uranium atoms are changed into new radioactive elements. After about 18 months, the fuel bundle is removed from the reactor. It looks the same; it is still a solid fuel bundle, but it is highly radioactive. The radioactivity, and therefore the toxicity of the waste, diminishes with time.

The used fuel bundles must be contained in shielded facilities and kept out of the environment. Ontario Hydro does this by storing them in pools of ordinary water, which shields workers from the radiation and keeps the fuel bundles cool. Each generating station has its own storage pool. Used fuel has been stored this way in Canada for 25 years, and there is no environmental contamination or apparent deterioration of the fuel. The method mentioned by Mr. Lawson, dry storage in concrete canisters, is an alternative, and the New Brunswick Electric Power Commission has just announced it intends to use this storage method instead of building a new pool.

By the end of 1987, there were approximately 12,000 tonnes of used fuel in storage in Canada. If you stacked it as you would cordwood, that would not be quite enough to fill an Olympic-sized swimming pool. You cannot actually stack it that closely for cooling reasons, so it takes several times that amount of space. Ontario Hydro has about 95 per cent of the used fuel in

Canada. Used fuel is being produced today at the rate of 1,800 tonnes a year. The generating stations now in operation and under construction will have produced three times what we have today, or about 36,000 tonnes, by the year 2000.

The Atomic Energy Control Board has responsibility for regulating all aspects of the nuclear industry, and waste management is no exception. The board has published regulations that set out what must be done in the long term with nuclear fuel waste.

These regulations require that the burden on future generations must be minimized by: (a) selecting disposal options that, to the extent this is achievable, do not rely on long-term institutional controls as a necessary safety feature; (b) implementing these options at an appropriate time, technical, social and economic factors being taken into account; (c) ensuring that there are no predicted future risks to human health and the environment that would not currently be accepted.

The Canadian concept for the permanent disposal of nuclear fuel waste is to bury it in a multibarrier disposal system in the rock of the Canadian Shield, one of the most stable areas in the world. Let me review briefly the components of that concept and the progress that has been made since 1981.

Our research has determined that the uranium dioxide that makes up the used fuel is highly resistant to dissolution in ground water under a wide range of geochemical conditions. It makes a very stable waste form without further processing. Most of the radioactive waste atoms will not escape if the uranium does not dissolve.

We have tested various container designs and materials and have concluded that a thin-shelled titanium container would last in the ground water found deep in the Canadian Shield for at least 500 years, during which time the radioactivity of the fuel would be greatly reduced. Our studies indicate that copper is also a suitable container material and could be used to make an even longer-life container, should this be necessary.

We are proposing that disposal containers be surrounded by compacted bentonite clay. This material swells considerably when it becomes moist, thus providing an effective seal, and water movement through it would be extremely slow. Most of the radioactive waste products in used fuel react chemically with such clay, which further inhibits their movement.

We have conducted a major geoscience program to investigate the geology and hydrogeology of plutonic rocks in the Canadian Shield and have developed a good understanding of the factors that govern the movement of ground water in such rocks. We have developed the technology for investigating potential sites to obtain the geotechnical information needed to design the disposal vault and to prepare an environmental and safety assessment for licensing. We have also developed the technology for constructing the excavated portions of the disposal system and minimizing the disturbance to the rock caused by the excavation. Based on our research, we believe that many potentially suitable sites can be identified in the Canadian Shield.

We have also conducted research to determine what would happen if minute amounts of radioactive waste products reached the near-surface environment. We have studied the uptake of such products by plants and their progress through the food chain and have determined how and in what concentrations they might reach man.

The physical and chemical processes that might lead to the long-term release of waste products from the kind of disposal system we propose would take place over thousands of years. Therefore, it is not possible to directly demonstrate the disposal concept's safety by burying the used fuel and watching to see what happens.

The approach we have taken is to provide an indirect demonstration of safety using mathematical models that represent various components of the disposal system. These mathematical models are based on a thorough understanding of the underlying physical and chemical processes involved. They are tested against carefully integrated laboratory and field experiments and, where possible, against natural systems. They are also designed to cope with uncertainty and variability in the disposal system.

Several of the earth's largest uranium ore bodies were formed one to two billion years ago and, in spite of continuous contact with ground water, have remained in place over this period of time. An example of particular interest is the Cigar Lake uranium ore deposit in northern Saskatchewan.

We have studied the ore body at Cigar Lake since 1984. It was formed 1.3 billion years ago. It is two kilometres long and has a maximum width of about 100 metres and a maximum thickness of about 20 metres. It contains about 150,000 tonnes of uranium dioxide.

Ground water has been in contact with the deposit since it was formed. However, there has

been no significant dissolution or movement of the uranium dioxide. This behaviour is consistent with our understanding that uranium dioxide can be highly insoluble, given the appropriate geochemical conditions.

The Oklo uranium deposit in Gabon, Africa, contained six natural nuclear reactors about two billion years ago. International studies of the materials at this site provide further information on the behaviour of elements of nuclear fuel waste in the subsurface environment.

Our understanding of these natural ore bodies is used to develop and support the models used in the analysis of disposal system behaviour. They provide invaluable information over very long periods of time under physical and chemical conditions relevant to a disposal facility.

On June 13, the Honourable Marcel Masse announced his intention to refer the question of nuclear fuel waste management to his colleague the Minister of the Environment, Tom McMillan, for review by an environmental assessment review panel under the federal environmental assessment and review process. Mr. Masse also said at that time that he was consulting the Ontario Minister of Energy (Mr. Wong) on this matter. Once the panel is established and its terms of reference are set, it will begin the task of identifying the issues that should be addressed in the review.

We believe that the disposal concept we have developed is ready for review, and we are beginning to prepare our concept assessment documentation. We expect to be ready to submit it to the panel in 1991. Mr. Masse has announced that he intends to have our concept reviewed by a scientific review group that will assist the panel, and the panel will look at the broad issues in nuclear fuel waste management as well as alternatives to our concept for disposal. The procedures of the panel will involve full public hearings.

We are looking forward to the review and the opportunity to present the results of more than 10 years of research. We believe we can show that used nuclear fuel can be safely disposed of in the rock of the Canadian Shield.

The Acting Chairman: Thank you. I am certain that the members have questions.

Mr. M. C. Ray: With regard to your last point, on the federal initiative for an assessment and review process for the disposal of nuclear waste, has there been any serious suggestion or study of packaging nuclear waste for disposal into outer space and directing it at the sun?

1530

Dr. Dormuth: Yes, that alternative was considered briefly in a overview in the early parts of the program, and it was concluded quite quickly on the basis of cost and on the basis of safety, for example, on a space shot shortfall, that it was not an appropriate alternative to pursue in much detail. Internationally, the general conclusion by all countries that have nuclear power systems is that geological disposal in some form is the most practical method of disposing of nuclear waste.

Mrs. Sullivan: I have questions relating to two areas of your presentation, the first two, Mr. Lawson, about the new Candu development and particularly relating to Candu 3. I wonder if you can tell me what your estimates of the operating costs of that reactor are in comparison to, say, the other internationally produced machines that you will be competing with.

Mr. Lawson: The cost assessment of the Candu 3 has been completed in quite extensive detail. The proposal in New Brunswick, where we are trying to get the first one launched, is to compete directly with the coal-fired unit it is contracting to build anyway. Our information to date is that we do see something like a 10 per cent difference in lifetime costs, with the Candu being cheaper than the coal unit. In actually determining the mill rate, one has to look at the dollars of which year and the assumptions for escalation. We have done that on a comparable basis for both coal and nuclear. We do get that cost advantage, and that is without desulphurization equipment on the coal unit.

Mrs. Sullivan: Those comparisons would hold against your nuclear competition as well?

Mr. Lawson: Yes. In terms of our nuclear competition, we did have a head-on competition in Korea between the Wolsong unit and the second unit on the Kori site supplied by Westinghouse. Over the operating life so far of something like five years, I think we are marginally ahead of the pressurized water reactor unit in cost reductions. We do have confidence that we can beat the competition. Of course, we beat the competition in the bidding stages in Turkey as well. We are confident we can compete in the international marketplace, which we have to be capable of doing, otherwise there is no value in continuing with the program.

Mrs. Sullivan: One of the presenters to the committee recently talked about one of the factors in the construction delay being created by

redesign of the project each time. I wonder if you would like to comment on that.

Mr. Lawson: Yes, I would love to comment on that. That is a disaster. There is nothing worse than going to a site and seeing people twiddling their thumbs, waiting for the designer's drawings. On the Candu 3, we have the full support of our owner, the federal government, to be continuing and doing the standard engineering up front. On the proposal for New Brunswick, we are looking at a reactor which will be in service in 1995. It will have basically three years of construction before that, about 20 months of buying equipment, and the time between now and the start of that is taken up by completing the standard design.

We are now in our second year of undertaking that standard design, and then the design will be frozen and there will be only the things that have to be done to the specific site, to match the product to the site, that have to be done there. We have to be very rigorous in this. We have to work with the Atomic Energy Control Board. We have their full support at present. They are working with us on it. We have looked at what other countries have done; we have seen that the Japanese have achieved this and have had success with it. We are working with them. If they can do it, we can do it.

Mrs. Sullivan: I want to move on to questions relating to waste management. I know there has been progress made so far in terms of the criteria relating to geological sites for disposal. I wonder how far you see us being in terms of the full selection criteria for disposal sites and the kinds of regulatory review that will be necessary in that process.

Dr. Dormuth: With regard to the technical criteria for the selection of sites, we are well prepared to present them and have them reviewed as part of the concept review process I said was coming about. I think the social and economic factors are evolving as well. It may take a longer time. There is more interaction required with various agencies.

On that front, the site selection method that has now been proposed where we are dealing with some of the historic waste, by the Department of Energy, Mines and Resources report by McTaggart-Cowan, may offer some progress in that area as well. In the area of technical site selection, as I said, I think we are well prepared to present those and have them reviewed when we present our concept assessment documentation.

Mrs. Sullivan: Given that the waste management process is such an enormously long process–the time frame is certainly going to be beyond any of our lifetimes and any of our grandchildren's lifetimes–how have you built into the system the monitoring of the success of the disposal?

Dr. Dormuth: The monitoring can essentially be carried on for as long as people feel they want to in the future, but long-term monitoring cannot be a required part of establishing the safety of the disposal facility. The basis for what we are doing is that we cannot rely for ever on institutional controls as a method of ensuring safety. Essentially, the monitoring can be carried on as long as people want to. The facility will be open for around 80 years while waste is being placed in it. There is monitoring all of that time. Monitoring can continue after that for as long as desired, but monitoring will not be required to ensure the safety of the disposal facility.

Mrs. Sullivan: I wonder why you rejected the Australian system of packaging the waste in synthetic rock.

Dr. Dormuth: We did not really reject it, but what we are doing at this point is coming up with an entire conceptual design based on present-day technology for this concept review. That is not to say that in the future there will not be some engineering optimization which might improve on aspects of that design. We did not reject it, but we opted for the current method as something we could do with current technology.

Of course, the repackaging you are talking about would require reprocessing. If the decision were made not to reprocess, we would want to dispose of the intact used fuel; so that is the main focus of the case studies we are doing for this concept assessment. The used fuel is a very stable waste form in itself, as I have said.

In the event of recycling–because it is present-day technology that we want to use, the use of borosilicate glass–you make a glass out of the liquid waste from the reprocessing operation. That has been shown to be viable on the full scale, such as at Marcoule in France, where they make glass out of waste. That is known to be a viable technology and that is why we would tend to use that currently as our reference disposal medium.

Mr. Charlton: Can we perhaps talk for a few moments about your approaches internationally in terms of the marketing of Candus? First of all, I would like to relate that to this whole question of waste disposal. You have decided, in terms of the Canadian operations of Candu reactors and

the question of waste fuel disposal, that deep-rock disposal is the most appropriate approach. When you are either out soliciting business internationally or considering proposals from international proponents for the purchase of Candus, do you take into account their ability to deal with the question of waste disposal in a manner that would be acceptable here?

1540

Mr. Lawson: In the broad sense, the answer is yes. It varies from country to country. Some countries like Korea already have eight reactors from the United States and France. At present, they are storing their fuel in the ponds and are looking to what they should do in the future.

We are in a position where we are quite able and open to talk to them about our experience, so we will share our research information with them so that they can make the decisions on what to do. It was mentioned earlier that the unit in New Brunswick has decided to look at the concrete canisters for storing fuel rather than putting it into new ponds.

The same decision has been taken on the Wolsong reactor in Korea. This could almost be looked at as an interim storage measure until some such time as people have decided on the final storage position because these concrete canisters are basically designed for 50 years. But the chances are they will last 100 years to 200 years.

They are in a position where you can go and look at them from time to time. If you are not certain, you can always take them back in, take the fuel out and put it into another one. Instead of having to keep all the services going for a pond, the whole of 17 years' life of Douglas Point fuel is there in 47 canisters just wired off. Someone goes around once every six months to make sure they are all okay. That can last for quite a while until a country has made a decision. So a country can make a decision quite far into the future.

Normally, when we are talking about the first unit in a country, the program starts with a study on the whole infrastructure because it obviously has to have the ability to license a station. Any country that buys it has to license it itself, so they have to have the technical capability to have their equivalent to the Atomic Energy Control Board.

They go to the United Nations agency and the International Atomic Energy Agency and use their facilities as well. There is a booklet from the IAEA that kind of guides people in the start of their program. That really does emphasize to people that you have to have all parts of your system at least considered before you enter into a program.

It does not mean to say you have to have the plan in the same way. When we started our Candu program, we did not say that such and such a community then would be the waste storage for the ultimate storage of fuel. But we have enough work in place for when it is needed.

Mr. Charlton: There are a couple of reasons that that, for me at least and I think probably for some others, creates some concerns. I will try to express at least that part of it that I have been exposed to.

A couple of years ago, we had a delegation over here looking at Candus from the Netherlands. You will recall that they were here as a result of a resolution which had been passed by their parliament that required any nuclear development in the Netherlands to include a package for foreign disposal of its waste. In other words, essentially what they were looking at when they were here was the ability to buy not only a reactor here but uranium here and be able to send its waste back to Canada for disposal.

We also have, on the other side of that question, the whole range of discussion that has gone on over the last 25 years around what spent fuel from Candu reactors will be used for and specifically the question of nonmilitary use of any of that spent fuel.

If, as a package, when you are selling a reactor, you do not have a firm commitment as to exactly what is going to happen with that fuel, and the country in question gets into the kind of political debate–whether it is a fair and scientifically relevant debate or not is another question perhaps–around the safe disposal of waste and they cannot resolve that question politically within their country, there is going to be pressure to find some other way of getting rid of that waste, including, potentially, 50, 60 or 100 years down the road, disposal to another nation for whatever purpose.

I would like you to comment on exactly how you see, in the context of all the things we have discussed over the last 25 years, dealing with those kinds of situations, if you are not fully assessing their ability to dispose of waste in a manner that is suitable to you before you sign the contract.

Mr. Lawson: There is one piece of it I would like to clear straight away, and that is that any sale has to be agreed to by a bilateral agreement with External Affairs in the country we are selling to. That is related also to the International Atomic Energy Agency's inspection, so there is

no doubt that for anyone to whom we are selling a reactor, that fuel is monitored, known about internationally and in Canada, if we are not happy with the international examination, so that we know where it is and that it is safely stored. That is a condition precedent, if you like, before a contract can be put in place.

Getting an agreement on precisely how they do it is one we have not been insisting on and, to the best of my knowledge, neither have other people in the marketplace.

Mr. Charlton: The extension of all of that is the Netherlands situation we had where it was clear right from the outset that their review of Candu technology was tied to a condition of disposal of waste in Canada. First of all, how does AECL view that kind of a condition and what approach did you take in that situation?

Mr. Lawson: At present there is not an inquiry out by the Dutch for their power plant. They are going through a process of gathering information and they will have a parliamentary debate on it.

The statement you are saying is correct. I visited the Dutch parliamentary people. They would very clearly like that. I think I would describe it as a wish list. They also are practical and they recognize that no one has really taken other people's waste to store it. People have reprocessed waste. Some of the Japanese fuel has been reprocessed in Japan and in the UK, but on the understanding that the active waste can be returned to Japan at some appropriate time.

There is not a great movement of fuel around the place, and we would and could not make any commitment on meeting that criterion, obviously, unless there is a very agreed policy to do so and there is no such policy at this time.

Mrs. Grier: I have some questions to Dr. Dormuth about the decommissioning, if I can start with that, and then perhaps a couple to Mr. Lawson. I had not realized Gentilly I was being decommissioned. Can you tell me something about it, how long it was in operation and why it is being decommissioned at this point?

Mr. Lawson: I would ask Joe Liederman. He was directly involved in that.

Mr. Liederman: I will attempt to answer that question as quickly as I can. The Gentilly 1 station went into service originally in 1972 and between that time and 1979 it operated intermittently. Around 1978, it was decided, or the regulatory authority, the Atomic Energy Control Board, required an extensive amount of modifications to be made to the station in order to secure an extension of the operating licence.

A fairly detailed economic assessment was made of the cost of those modifications and, ultimately, it was decided in 1979 to take the unit out of service. After some further study and discussions with Hydro-Québec, in approximately 1981 a decision was made, strictly on an economic basis, not to rehabilitate the station.

Primarily, the economics of the situation was the contract between AECL, which owned the station, and Hydro-Québec, which operated it and bought the electricity. The agreement was that Hydro-Québec would pay only a marginal cost for that electricity, and it was very difficult to compete with the hydroelectric rates that Hydro-Québec had in that particular agreement, so it really did not make economic sense for us to rehabilitate that particular station further.

1550

Between 1984 and 1986, we had a two-year program which decommissioned that unit into what we call a static-state condition. That is the condition that unit is in now. The major part of the station has been turned over to Hydro-Québec in a clean state and, in fact, most of what was called the service building now houses a full-scope simulator and training centre for the adjacent Gentilly 2 station.

Mrs. Grier: What has been spent so far on the decommissioning?

Mr. Liederman: The cost in 1988 dollars for the decommissioning of Gentilly 1 was $28 million.

Mrs. Grier: When the station went into service, how long was it anticipated that it would be operating?

Mr. Liederman: The design life of any power plant, at least at that particular time, was approximately 30 years.

Mr. Lawson: Can I just add a point on that? Gentilly 1 was a prototype boiling light water, heavy-water-moderated reactor. It is not the same as the Pickering type. It was a reactor where light water was used for cooling and went directly into the turbine instead of the secondary circuit, which we have on Pickering. It was being considered as an alternative in case Candu of the Pickering type did not work successfully. It suffered a chequered early background because the heavy water from Gentilly 1 was shipped to Pickering to get Pickering going. Pickering was a success; therefore, it was not necessary or worth while to pursue the alternatives. So it was really a prototype.

Mrs. Grier: Thank you. In the discussion of decommissioning–I guess it was in Mr. Lawson's paper, not in the other one–you talked about the reuse of the sites. We heard something about that from another delegation, the fact that once the site had been established, the transmission facilities were there and acceptance was there, rather than grass it over, it made sense to reuse it. But I take it from something you said that it might well be 80 to 100 years before it could be reused. Could you clarify that for me?

Mr. Lawson: Yes. I think I put a qualification on it that that time was dependent on other needs for the site. We have done an examination of the cost if we did it at 50 years instead of doing it in 100 years. Seeing that you have to put away the money during the operation, the actual difference in cost is not very much between doing it at 50 years, where the actual expense is more expensive because it is more active, and doing it at 100 years. If after a reasonable period of time–and nuclear periods of time seem to be reasonable at 50–you wanted to use that precise bit of the site, then you would dismantle that piece of equipment.

I should also say that when you look at some of the nuclear sites, the actual area taken by the active component, once you have gone through the stage of decommissioning, is quite small, and what you probably do is build the next one immediately alongside. In fact, that is one study that we did look at for the Rolphton site, the decommissioned NPD there. We could have used the same site, just adjacent to it, to put in a second unit using a lot of the infrastructure still.

Mrs. Grier: On the sort of long-term waste disposal issue, presumably some of the sites that are being looked at are within Ontario.

Dr. Dormuth: The general assumption under which we started the program was, in fact, that the first repository would be in Ontario. We have not, as I said, got responsibility for doing any site selection. We feel there are a large number of potentially suitable sites in Ontario, but we have not actually identified specific sites.

Mrs. Grier: Can you tell me how much has been spent so far on the whole issue of long-term waste management and disposal?

Dr. Dormuth: In our research and development program, about $230 million.

Mrs. Grier: In Mr. Lawson's initial presentation, he raised the question, "The question then is: Can nuclear compete with coal?" and that is always how it is phrased. We have heard a lot before this committee about the potential for cogeneration with industry and the use of natural gas as a fuel. I am wondering (a) why it is always phrased, "Can it compete with coal?" and (b), if you phrased it "Can it compete with other potential forms of energy?" what then becomes the answer.

Mr. Lawson: We have largely concentrated on the coal one because there are lots of other options which I think are going to be seen in the coming years, not only here but in the United States, in the smaller-sized unit, and in the combined cycle there are probably only smaller-sized units in the earlier years. We believe that for base load growth there are not many options other than the big coal-fired units like the Nanticoke or the nuclear unit, so that is the main comparison we made.

In looking at some of the others, it becomes a futures guessing game. What really is going to be the price of gas in the future? You talk to different countries and you have different answers on that. In fact, even in comparing Candu with coal, you have that same problem: you are putting all of the capital up front in coal and nuclear and got very low fuel costs and escalation costs in the future, as opposed to coal where you have virtually no capital cost without scrubbers–now with scrubbers, the capital cost is getting up a bit but you have a higher and escalating coal cost in the future.

Mrs. Grier: We heard yesterday from the Canadian Nuclear Association about its PR campaign and the research it has been doing about the attitudes towards nuclear. Has Atomic Energy of Canada Ltd. been a contributor towards that or what role it has played?

Mr. Lawson: Yes, AECL is a contributor to that. It is obviously fairly important that we have all of the people who influence decisions understanding what we are trying to do and the results of that.

Mrs. Grier: I guess finally is the question that all of us asked since the release last spring of your list of environmental groups that were considered a threat to the nuclear program: Did the select committee feature, and if so, how were we rated?

Mr. Lawson: I am not personally aware. I have read what has been in the media. I have not see the documents. I have not seen the list of people. I would be ever so surprised if it were.

Interjection.

Mrs. Grier: I was not specific. I did not say was I listed; I said was the committee listed.

Mr. Lawson: I was sincere in saying that we really did want to appear here because we felt we

wanted the opportunity to have some dialogue with you and to tell you what is going wrong and also to be listening and hearing the question to make sure that our own thinking tries to reflect the concerns that you have, and that we get the answers to any questions we do not adequately answer here.

The Acting Chairman: We will see that you are on the list.

Mr. Runciman: I am wondering if you could talk a bit about Candu 3 in respect to the Ontario environment and the DSOS. What kind of role do you see Candu 3 playing in Ontario's energy future, if any?

Mr. Lawson: The use of Candu 3 in Ontario is one that would be quite speculative, because you are going through an assessment now. The opportunity to build multiple-unit small stations might give more flexibility in matching up the supply with the demand. There are areas of the country where it could be appropriate to introduce a smaller unit to look after the local area, rather than build a very large unit in the Lake Ontario region.

Because of our involvement in NPD, we did ourselves look at whether a Candu 300 could fit on to the Rolphton site. Technically that is feasible, although it does not particularly match very well the Ontario Hydro distribution system at that point and would require a transmission infrastructure support in that area.

We are fully open to talk to anyone, including the utility or anyone else in Ontario, to see if it is appropriate, because building one of these in Canada does open the possibility of fairly significant sales, we believe, of this model that does match what a lot of other utilities would want.

1600

I should also add that a lot of the ideas that were built into it we put into this size. The technology could equally well be applied later in the larger sizes, but we have put it in the smaller size first.

Mr. Runciman: So there is only the one potential site that you have looked at in respect to a Candu 3 for Ontario and that Hydro has incorporated into the deal? That is the Rolphton site, is it?

Mr. Lawson: I do not believe that Hydro was included in that. I think, in the table that I have seen, they compared a single Candu 3 to a four-unit Darlington B, which is, you know, comparing 450 megawatts with the economies of scale of building 3,500 megawatts. One wou have to look at a different comparison from tha

There are other factors. The very sho construction time does give you more flexibilit It gives you a return on your money earlier, well, which, of course, is interesting to a lot overseas countries where they have to get loa for building their power plants.

Mr. Runciman: Maybe I am misinterpretir your role, but you are attempting to purs markets, if you will, in a variety of jurisdiction It seems to me that this is for the Candu 3. seems to me that perhaps this is an appropria venue, if you will, in terms of very seriou consideration of the usage of the Candu 3 Ontario.

I am just trying to determine–obviously, yo have not done much in respect to determining i potential for this environment.

Mr. Lawson: I would say that we have n done a lot at this point. The main thing is to mak sure that we have an adequate project and that w have the engineering finished to a state where w know what the price is. We are well on the way t doing that. We then need to see, basically, domestic first unit so that people can be secure i what they are buying after that.

Mr. Runciman: Which will be New Bruns wick?

Mr. Lawson: That is why we are looking New Brunswick, because the site exists. W have gone through the environmental assessmer approval process once for that site and for second unit on that site, so that does allow us t move faster. Of course, there would still have t be the time to go for an environmental hearin process here in this province.

Mr. Runciman: But you were talking abou being on stream in New Brunswick in 1995. Yo have an assessment period after that, so it is–

Mr. Lawson: You do not need to have ful operating power to feel fairly confident. Onc you have signed on the bottom line with contract and you are well into the construction and peopl can see what they are getting and they see all o the things in place, we will not be waiting unti 1995 to get subsequent orders. We believe ther are other orders capable of coming for the Cand 3 well before that.

Mr. Runciman: You are talking about off shore markets?

Mr. Lawson: Yes.

The Acting Chairman: Thank you, Mr Lawson, Dr. Dormuth and Mr. Liederman. I

was a very fine presentation. You have given us some food for thought.

Mr. Lawson: Could I just make one brief point?

The Acting Chairman: Certainly.

Mr. Lawson: A lot of the information that Dr. Dormuth talked about is publicly available. There is a mass of data produced and published on the waste management program. They do have a technical advisory committee which is an independent committee that is a monitor over their activities. They are also, I think, available to be talked to.

The Acting Chairman: At this point, I would like to welcome Mr. John Ahearne to our committee. Mr. Ahearne is the vice-president of Resources for the Future, a nonprofit research organization from Washington, DC. He is the former commissioner and chairman of the Nuclear Regulatory Commission in the United States. Welcome, sir.

RESOURCES FOR THE FUTURE

Mr. Ahearne: Thank you, Mr. Chairman, and thank you, committee members. I think you are having distributed to you a set of tables and I will use those to review what I was asked to cover. I am going to try to give a very quick overview of the worldwide status of nuclear power. I recognize, from some of the questions that have been asked already this afternoon, that I think there is a fair amount of knowledge already existing in the committee on nuclear power.

After a brief description of the current and probable near-future development, I will outline the world nuclear energy picture, which provides the necessary background to understanding the motivation behind nuclear power development in several countries.

I will then talk about the principal countries in terms of their use of nuclear power, examine their existing plans and current problems and I will comment about the possible market for nuclear power in the developing world. I will try to look at Canadian nuclear power from the perspective of worldwide use and compare the major Canadian utility with a similar utility across the border. I will talk a little bit about the Candu reactor–obviously not with the level of detail the previous gentleman had–and, at least from my perspective, its place in world use. Then I will mention a few problems of nuclear power and a few advantages.

As sort of an overall background, the share of world electricity generation that was produced by nuclear power has risen from one tenth of a per cent in 1960; in 1987, 16 per cent of the world's electricity came from nuclear power.

In 1987, nuclear reactors for electricity generation were being operated in 26 countries out of 113 countries which belong to the International Atomic Energy Agency, the IAEA. Table 1 lists those countries that have more than 10 reactors and you can see there are only eight of them. Later this afternoon, we will see seven of those countries many times. You see, the US has the largest number and then there are two with about 50, the USSR and France; two with close to 35 to 40, the United Kingdom and Japan; two with around 20, the Federal Republic of Germany, or West Germany, Canada, of course, and then Sweden, which is number eight.

The second table looks at nuclear power used slightly differently, and that is, in the capacity. Some countries build a lot smaller reactors than others. Here we have all of those countries that have at least 10 gigawatts of electricity. I am not sure whether gigawatt is a common term here. A gigawatt is 1,000 megawatts.

So here, you see again the US with the most, France, the Soviet Union, Japan, West Germany, Canada is number six, the United Kingdom is number seven and Sweden has dropped off the list because Sweden does not have 10 gigawatts of electricity.

At the end of 1987, 417 reactors were operating around the world. The total capacity was around 300 gigawatts of electricity. Now, in addition to operating reactors, there are also reactors under construction. Nuclear energy is still being built worldwide. There were 120 reactors under construction in 22 countries at the end of last year. That represented a capacity of a little more than 100 gigawatts.

I have listed, on table 3, the countries that have at least five gigawatts under construction: the Soviet Union, with the most aggressive nuclear power program, and then the US, France and Japan right about the same. Finally, another country coming into my list for the first time is Czechoslovakia, representing the fact that some of the eastern European countries have now begun to get very seriously interested in nuclear power. Czechoslovakia right now has eight operating nuclear reactors. They are all 400-megawatt reactors.

In addition to these big eight or nine countries with power reactors that I have now mentioned, many more countries, close to 100, operate research reactors. What I have shown in table 4 are the countries that have at least 10 research reactors. The significance of a research reactor is

twofold. First, it indicates that a country has a serious interest in trying to explore the use of nuclear energy, but it also serves as a mechanism by which new people are being trained and new designs can be tested. You can see once again the same seven countries appearing with respect to this list of research reactors.

1610

Talking about operating reactors, a standard measure–it is not the only one–of how well a generating plant operates is what is called its load factor or its capacity factor, which essentially is a measure of how much power the plant was generating compared to how much it could have generated were it running all the time.

A plant's capacity factor can fluctuate from year to year and due to a lack of need of its power. Sometimes a nuclear power plant's power is not needed. Many reactors require to be shut down to be refuelled, so that cuts into it, or there may be unusual maintenance demands.

What I have listed on table 5 are all the countries that have at least four reactors operating, and this is their load factor or capacity factor. The significance of this really is that it is a measure of how well the country's reactors operate. There have been many debates about the significance of that, but it is important.

If you look at the table, you will see there are only four countries that have had a lifetime load factor of above 75 per cent for their operating power plants: Switzerland, Finland, Belgium and Canada. On the far right, what I have indicated is the rank for any country that has generated more than 500,000 gigawatt-hours of electricity. In other words, some of these countries just have a few reactors, but for those countries that have a lot of reactors, Canada is the only one whose reactors over their lifetime had a load factor of more than 75 per cent.

There is another block of about five countries between 65 per cent and close to 70 per cent. Of those, the Federal Republic of Germany is number six and Japan is down there at number nine. Those are the other two countries that have a lot of reactors that generate a lot of power but have done quite well. You can see it rapidly falls down to where the United States, the United Kingdom and India are really getting down around 50 per cent.

Finally, table 6 shows the percentage of electricity generated by nuclear power by many countries of interest. The figures are for 1986. These are all of the countries that had at least 10 per cent of their electricity from nuclear power. You can see there are only three countries that got more than half of their electricity from nucle power: France, Belgium and South Korea. The are approximately five that got at least a third their electricity from nuclear power, and then begins to drop rapidly down. Canada is numb 16.

What this indicates is that nuclear power widespread in the world. There are only a fe countries that have made such a major commi ment to it, but it is the critical element in the electricity grid. I am sure, as you know, France the one country worldwide that is viewed having made the largest commitment to nucle power. In fact, as you can see, it has made a almost sole commitment to nuclear power.

Canada, as you know better than I, uses a lot o energy and generates a lot of electricity. What have in table 7 is a very odd unit. It happens to b a World Bank unit, which is a kilogram of o equivalent, but it is the per capita energy use an the importance is the relative scale, at leas according to the World Bank. In 1986, on a pe capita scale of the countries the World Ban listed, Canada used the most energy, followe closely behind by Norway and then the Unite States. Those were the three large per capit users of energy and then it begins to drop down.

You will note that with the exception o Norway, all of these countries are again the Bi Seven which have nuclear power. Nuclear powe tends to be being used in industrialized countrie and the industrialized countries tend to use a lo of energy. It is that type of correlation.

I notice that Ontario Hydro had reported tha the average Ontario household uses more thar 10,000 kilowatt-hours per year. In comparison, in the United States it is about 8,500 for the average household, in recognition that a lot of the utility use in the US peaks in the summertime on air-conditioning loads.

What I have shown in table 8, in trying again to fit these major countries that have nuclear power in some type of perspective in their electricity use, is the electricity generation in thousands of gigawatt-hours and the sources of that generation for Japan, West Germany, France, the United States, the United Kingdom and Canada in 1986.

Obviously on this type of scale, because the US has so many people, it uses a very large amount of electricity. If you look across the top row, you will find that Canada, not surprisingly, is the leader in getting its electricity from hydro power. Somewhat surprising perhaps is that the United States is second in doing that. You might be surprised to note that Japan still gets an overwhelming portion of its electricity at this

ıtage from burning fossil fuels. Recognize that it s essentially all imported; Japan imports all of its nergy.

The bottom line notes the fact that there are nly two countries on this list that export a lot of lectricity: France and Canada. As you know, Canada exports a lot of electricity to my country, nd France is now both exporting electricity to England and trying to make sales in the rest of Europe.

The perspective I am trying to make is that with a possible asterisk on Sweden, there are eally only seven nuclear power countries in the vorld; that is, countries that have made a major ommitment and have lots of nuclear power lants. Let me talk briefly about those seven and ry to give some perspective of what is happening here.

France has the most dominant nuclear power rogram. The program is not unlike that of Canada. In France there is a single-state utility, ne manufacturer and one builder. It has been a uccessful program. France has the lowest lectricity rates in Europe. However, in order to naintain the French manufacturer in the face of o world markets, the French have continued to uild even when the national demand was not nough to support the program.

As was just seen in the last table, France now xports electricity. In fact, it uses some of its lants in load following. With regard to load ollowing, for those who are not familiar with it, sually you build a base-load plant on the ssumption it will be operating all the time. Then requently one builds a smaller plant that may be nore expensive to run, but can run up and down 1 power level quite quickly, and that follows the oad. If your load increases due to a surge in emand for air-conditioning or a surge in demand or heating, then the peaking units can come on. rance has had to use some of its nuclear power lants in load following, because of its excess apacity.

The French utility, however, now predicts that ie percentage of electricity from nuclear will limb to 77 per cent in the 1990s from the 70 per ent that exists now. However, a few months go, the French Ministry of Finance said that nless nuclear power can penetrate the French iarket for heat and steam, then the French utility 'ill have five to six surplus reactors in the 1990s.

The French program has often been admired y industry, particularly for what was perceived be strong public support. However, last year e head of construction for the French utility, lectricité de France, said:

"Chernobyl has had a major impact on public opinion, especially in Europe. Europe was woefully unprepared for such an event. Two out of three French people were pro-nuclear before Chernobyl. This figure has now dropped to one of two."

Nevertheless, since France has almost no domestic sources of energy, except uranium, nuclear can be expected to retain its overwhelming role.

Japan also has few indigenous sources and must import very large amounts of coal and oil, a large amount of that oil coming from the Middle East. Therefore, the Japanese have had a very ambitious nuclear program. It includes developing all segments of the fuel cycle. They are developing an enrichment plant. They use enriched uranium in their power plants. They are developing a reprocessing plant, which is already running. They also have a strong development program to design advanced reactors as well as a breeder reactor program.

1620

However, Japan's nuclear industry is also becoming quite concerned about public opposition. I will read you a quote from earlier this year at the Japan Atomic Industrial Forum:

"At the opening of its annual conference last month, the chairman of the forum called on the nuclear industry to mount a public information campaign to deter further opposition. The head of MITI"–which is the government institute of technology that works to try to improve industrial penetration of markets–"is concerned that the protest movement has spread from the vicinity of power plants to major cities. He says the protests are not based on expert knowledge but on simplistic slogans such as 'Nuclear Power is Dangerous,' and 'There is a Surplus of Electricity.' The campaigns are becoming increasingly sophisticated."

A recent survey done by the Japanese Prime Minister's office showed:

"There is an increase in the number of those who regard nuclear power as a primary electricity power source for the present and future and who think it should be increased. However, at the same time, there is also an increase in the percentage of those who have misgivings or feel concern in some way or another about radiation waste management practices."

They have been asking the question over a period of years, "Do you have misgivings or do you feel concerned about nuclear power generation?" In 1980, 56 per cent said they had misgivings or concerns; in 1984, 70 per cent, and

last year, 86 per cent. Their concerns related to leaks of radiation due to an accident, the effect of radiation on human bodies in posterity and the problems of storage, treatment and disposal of waste.

Finally, the editor of a Japanese nuclear industry journal wrote, in February:

"One could easily put much of the blame on the media. A more essential problem is the discrepancy of the communication gap that separates the nuclear interests from the people in notions of nuclear safety. Just as preventive maintenance is important to the prevention of plant incidents and malfunctions, supply of appropriate information is essential to public acceptance."

West Germany has large amounts of coal; it is one of the leading possessors of coal. However, it is expensive. It costs about US$120 a tonne for their coal. In addition, the visible severe impacts of pollution on German forests have led to very tough emission control regulations, which are increasing the price of coal-generated electricity. As a result of some of these factors, Germany has had an aggressive nuclear power program. They have a breeder program and they spent many years developing a high-temperature gas reactor.

The public opposition, which has always been present in Germany, has grown stronger in the 1980s, helped by the emergence of the Green Party. The opposition Social Democratic Party in 1987 announced that if it were to take power, it would close all nuclear power plants in Germany in 10 years. Also, intervention has risen. Germany has a legal system not unlike that of the United States, in which licensing decisions can be challenged in court. Just earlier this month, in September, Germany's highest court closed a plant, ruled that an operating plant had to close because the plant's licence was ruled to be invalid, that the utility had followed the wrong procedures. The estimate is that it can take three to 10 months, maybe longer, to get the licence. That same plant was shut down for nine months in 1986, because the court had ruled that it had not followed correct procedures in licensing the cooling towers.

The United Kingdom was an early leader in nuclear power. It has remained a major nuclear generator, although its program has struggled for many years. They opted for a gas reactor, which was never endorsed outside of the United Kingdom, and in the mid-1980s the Thatcher government decided that the next line of reactor should be a British-built pressurized water reactor. That is the next reactor now being built. The British public has been relatively passi[v] with respect to nuclear technology in genera[l] although it is strongly opposed to siting nucle[ar] waste dumps, and there is still a remnant ang[er] about the Windscale accident in 1957.

As you may remember from some of tho[se] earlier charts, the Soviet Union is building th[e] most nuclear power plants of any country in th[e] world. Less is known about the program becau[se] of the historic Soviet secrecy. The more rece[nt] willingness of the Soviet Union to permit acce[ss] to its plants, particularly following Chernobyl, [is] beginning to provide insights. Although th[e] Soviet Union possesses very large amounts [of] oil, gas and coal, it still is pushing forward ver[y] aggressively with a nuclear program.

The argument that the Soviets give is that the[y] have most of their energy resources in th[e] western part of their country, Asiatic USSR, bu[t] that most of their industrialization and th[e] demand for electricity and energy use is i[n] European USSR. Another reason is probably th[at] the USSR gets a very large amount of its har[d] currency from the exports of its oil and gas. I[n] 1986, 60 per cent of its export earnings cam[e] from the export of oil and gas.

Nevertheless, even in the Soviet Union som[e] opposition is coming up. They have announce[d] an aggressive nuclear power program. Thei[r] power program at the moment has a goal o[f] adding 6,000 megawatts per year every year fo[r] the next 20 years. Nevertheless, in August the[y] did announce that the two remaining units at th[e] Chernobyl site, units 5 and 6, would not b[e] completed, and Izvestia just reported cancella[-]tion of a cogeneration unit that was going t[o] provide both electricity and district heating. I[t] was cancelled because it was too close to th[e] centre of the city. It was listed as being about 2[0] miles.

Across the border, in the United States, we go[t] about 18 per cent of our electricity in 1987 fro[m] nuclear power, but it has been really moribun[d] since the mid-1970s. Overbuilding, coupled wit[h] the oil crisis, halted orders even before the Thre[e] Mile Island accident. There have been no order[s] since 1978, and 100 plants have been cancelle[d] since 1975, plants for which money had been pu[t] down and in some cases at least 50 per cent built[.] Nevertheless, in the first six months of this pas[t] year almost 20 per cent of electricity came fro[m] nuclear power.

Problems in the US include lack of demand–the growth is forecast to be only about two pe[r] cent a year–and spiralling costs, with some new plants costing almost $6,000 a kilowatt. The

average cost of the seven plants that came on last year was $4,400 a kilowatt. To put that in comparison, the coal plants that are coming on with scrubbers cost about $1,600 a kilowatt. A third reason is bad management and poor operations, as could be seen in those very low load factors; and fourth is public opposition.

Public opposition may be changing. Recent public polls in the US show an ambivalent attitude. Although when asked, "Should more nuclear power plants be built?" about 80 per cent of the public says no, when asked, "Are we going to have to build more nuclear power plants in the future?" about 60 per cent of the public says yes.

I think what it really indicates is that in another poll that looks at how important energy issues are, about three per cent of the public say they are important. I think it is more that they just have not focused very much on "Will energy be important?" and "How does one get electricity?"

Finally, I will just make a comment on Sweden. Sweden showed up on one of the lists. Sweden does have 12 power plants operating, but just this month the party in power was returned to power and it is committed to the program put in place earlier in the 1980s; that is, that two of those plants have to phase out in the mid-1990s and the other 10 are supposed to be phased out by 2010.

Is there a market for more nuclear plants? Perhaps. But what is more certain is a market for electricity. EPRI, which is the US Electric Power Research Institute, has examined the link between electricity consumption and gross domestic product or gross national product, and found a direct correlation. As the GNP–or whatever term you use for measuring the total economic output of a region–goes up, electricity goes up, connected directly to it. It looked at the United States, developed countries and developing countries, and although the slopes are different, the connection is there.

It certainly held for the United States. In the US, total energy use per capita has declined since the oil shocks of the mid-1970s, but electricity use has risen per capita. The rate of growth in electricity demand has slightly lagged the growth in GNP, and I note in reading Ontario Hydro's forecast that it forecasts its most likely demand growth of 2.4 per cent per year, which slightly lags what it indicates is the 2.8 per cent year real economic growth expected in Ontario.

In 1987, the United States Agency for International Development, which is the US agency that tries to provide assistance around the world, forecast that the developing world will need between 1,000 and 2,300 gigawatts of new capacity in the next 20 years.

1630

However, in spite of all that talk about electricity and its value, the world market for nuclear power has been very weak to nonexistent. One of the reasons is that the principal users of nuclear power manufacture their own plants: the United States, the Soviet Union, Japan, West Germany, the United Kingdom, Sweden, and of course, Canada. Hence, what markets exist in those countries where most of the nuclear power plants are will most likely be captured by national firms.

Outside those countries the market is very tight. Atomic Energy of Canada Ltd. did capture the Romanian market. However, the rest of the Soviet Union's allies use either locally built plants–Czechoslovakia is now building its own–or Soviet plants.

Brazil has had very poor experiences with nuclear power. It is obviously one of the major countries in South America and its forecast for electricity demand is the biggest in South America, but it does not look to be much of a nuclear market in this century. Argentina has had a successful program and may be a future market. As you know, Candu is running very well in Argentina.

The developing world looks to countries like Mexico and the Philippines and sees the great problems they have had trying to introduce nuclear power plants, and I think with great scepticism then addresses the question of whether they should buy nuclear power plants.

In the Asian countries outside Japan, the market has been of great interest to all manufacturers. As you saw earlier, South Korea and Taiwan do get a lot of their electricity from nuclear power and they have been buying reactors. Taiwan, however, has levelled off, and South Korea is now building its own.

Canada, of course, has had some unpleasant experiences with India and other of the major electricity markets, but India is now building its own plants. The largest untapped market, that is, the People's Republic of China, which for about eight years was offering tantalizing hints that it was now going to go out and buy a lot of nuclear power, finally did sign a couple of contracts, but it is very clear that its intent is to very rapidly bring the technology within China and build its own.

Consequently, although aggressively marketing the current designs, most manufacturers believe new markets, if they develop, have to be

developed based on new designs. The new designs have to be simpler, cheaper, easier to build and for smaller and safer plants.

Turning to Canada, the forecast of Ontario Hydro appears to be very similar to those of most other industry and government groups in North America. Hydro estimates that based on its most likely load growth and 100 per cent incentives for conservation load shifting, as you know from its document, new capacity will not be needed until 2004 to 2007, depending on whether demand management is low or medium success.

With capacity not needed for 16 years, some opportunity to live with the near future seems possible, although as I am sure you have noted, Hydro argues that meeting capacity needs with large plants is hindered by the very lengthy approval process of five to eight years. It argues that it estimates the time from beginning the approval process to operation to be 10 to 16 years.

When I look at nuclear in Canada, it seems primarily to be examining Ontario Hydro, so when I examined Ontario Hydro, I thought it interesting to compare it to a similar large utility across the border, the Tennessee Valley Authority; that is table 9. I am comparing Hydro's numbers for 1986–the best I could get, unfortunately–with TVA's 1987. As you can see, the total generation in gigakilowatt-hours is just about the same, around 121. Hydro listed a peak of almost 21 gigawatts; TVA's peak was in 1982 at 24. TVA's and Hydro's capacity is about the same, 31 and 32. They serve just about the same number of residential customers, about 2.9 million. Hydro has a few more commercial and industrial customers.

But the mix of their generation facilities is quite different. They both get around 20 per cent from hydro power, but there the comparison stops. As you can see, Hydro gets about 35 per cent of its electricity from nuclear, whereas the Tennessee Valley Authority gets only about 18 per cent.

TVA is dominated by fossil power. Hydro has a far more balanced program. I note in the submissions from Hydro that it plans to shift by 1993 to 43 per cent nuclear, 37 per cent fossil. TVA actually had planned a much larger nuclear program. It had planned to approach 40 per cent. However, a long series of problems has led to nuclear becoming far more a source of death than of power for TVA.

Hydro has done very well with its Candu reactors. Candu reactors compare very favourably with other nuclear plants. The final table shows the top 10 performers worldwide in lifetime load factors. Of those top 10, quite obviously, seven are Candu reactors. Unfortunately, I guess, for Ontario, the first one is not Ontario's Candu reactor.

Of the other reactors, the Hungarian reactor is number two and also number eight. Those are Soviet Union 440-megawatt reactors. The Federal Republic of Germany's reactor is a 1,300 megawatt reactor built by an FRG firm. The Swiss reactor is 350 megawatts. It is built by Westinghouse. The United Kingdom's is a gas-cooled reactor of 150 megawatts. It is a very small plant.

Out of over 300 reactors, all but Pickering 1 and 2 of Hydro's Candus rank in the top third worldwide, and excluding Bruce 2, the other eight rank in the top sixth.

Given this excellent record of performance, why have not more countries bought Candus? I am sure Atomic Energy of Canada Ltd. can provide better insights than I. However, there are a couple of factors I will mention. First, there seems to have been in some countries a concern about the supply of heavy water. Although the Candus use natural uranium, they do use another quantity most countries do not manufacture; that is, heavy water.

The second is cost. Getting a handle on nuclear power costs, and I know you have tried, is very difficult. There are no good cross-country, cross-reactor cost comparisons. The costs within a country are often masked by a variety of subsidies. International sales can be very strongly influenced by a government's contribution to the financing arrangements and by a company's willingness to transfer most of its technology.

Many of the countries that did not have much in the way of nuclear power plants had as a quid pro quo, a condition of the sale–you pointed out that the Netherlands was interested in who would take the fuel, but many of the countries are interested in who will sell them their technology. "We are not just interested in a plant. We want soon to be building our own."

It is very difficult. I have not managed to find anywhere something that that would be able to really say how you can stack up and say which is the less expensive plant over its lifetime–unfortunately.

Licensability: In a report I gave to the Ontario Nuclear Safety Review, I addressed the licensability of the Candu. I looked at it from the standpoint of the United States. I will tell you why that might be important. I concluded that to license the Candu in the US would require

ıbstantial effort, probably some redesign and ould entail a long and contentious process ısed upon the Candu's meeting the require- ents of the US Nuclear Regulatory Commis- on.

It is not that I question the Candu's design, but ıbstantial analytic work would be required to emonstrate to the NRC that its regulations were et. Many countries in the world have developed eir regulatory framework based on using the RC's regulations. Not being able to demon- rate that the Candu meets the NRC's regula- ons may be a hindrance.

Finally, with respect to scale, France and the oviet Union continue to develop large nuclear ants, but much of the world design effort is cusing upon smaller plants. A Hydro planning ocument notes the importance of maintaining exibility and planning for the future because of e large uncertainty in demand growth. How- ver, Hydro notes that economies of scale make rge nuclear units desirable. Hydro argues that nits of 500 to 1,000 megawatts are significantly heaper than smaller ones, and that reducing to 00- to 300-megawatt units would substantially icrease costs.

640

In the United States, faced with similar ncertainties, the utility planners are opting for as turbines. These units can be built in two to ıree years to generate 100 to 200 megawatts, at apital costs of about $1,000 per kilowatt. owever, the fuel is quite expensive, so operat- ıg them over a lifetime is more expensive. It is ıore expensive than a coal plant and certainly ıore expensive than a nuclear plant. But for the tility planner facing uncertainty in trying to ecide how much demand is going to be there ı a few years, it always looks like a much ıore prudential option. Many people question hether, over the long term, it is.

The economy-of-scale issue is being recon- dered, at least in the US. The Electric Power esearch Institute, which is the research group ɔr the utility industry, found no economies of cale in the study of US plants of 600 to 1,200 ıegawatts and no economies of scale in the rench 900 to 1,300 megawatts. So there is at ast an increasing interest in the US in trying to ɔok at smaller designs, smaller moves, back to 00 megawatts. In some cases, that is still very ırge.

Finally, problems: Nuclear power does have roblems which know no political boundaries. irst, safety is a concern everywhere. Three Mile sland and Chernobyl are symbols for concerned citizens speaking many languages. As the former United States atomic energy commissioner, Dixie Lee Ray, said a few months ago, nuclear has an image problem.

Second, plants cost a lot, particularly for a developing country. Even if one says it is going to cost only $2,000 a kilowatt, if the plant is a 400-megawatt plant, that sizeable amount is an enormous capital investment for a developing country. It is another argument for small plants.

Third, waste disposal is a nagging problem. I would argue that few countries are making progress on it in the sense of finding a site where you would put the waste. That is something countries throughout the world are still having great difficulty doing. There is a lot of work going on in many countries on various types of encapsulation and various types of studies on how to do a geological depository, but actually getting one has turned out to be extraordinarily contentious, whether it is in the United States, Canada, Japan, West Germany, France, any- where. I do not know about the Soviet Union.

Finally, ageing: Nuclear plants begin to wear out, as seen in the Pickering pressure tubes. By the year 2000, no Canadian power reactor will have reached 30 operating years, but six will have reached more than 20. Internationally, when groups of international nuclear people get together these days, research on ageing phenomena turns out to be one of the major topics of interest.

Nuclear power does have advantages. When built and operated well, it provides relatively inexpensive electricity, and when safely run, substituting nuclear power for fossil fuel genera- tion can help significantly in the battles against acid rain and greenhouse warming.

That is a long, quick attempt to survey the world.

The Acting Chairman: Thank you. I am sure we have some questions, and the first question is from Mrs. Grier.

Mrs. Grier: That was a mind-boggling attempt to survey the world, and it really has been a privilege to get the benefit of your expertise. I was going to ask you why we have not sold more Candus, and you answered that.

Mr. Ahearne: No, I said why I thought it might be.

Mrs. Grier: Yes. You gave the scenario that is acceptable, or at least believable. But am I right that in the countries that have nuclear plants, we do not even have Candu-type reactors being built?

Mr. Ahearne: That is correct, but that is because the Candu is a uniquely Canadian design; that is, the Candu design was the choice Canada opted to build. Much of the rest of the world really followed the US design. Actually, both the US and the Canadian designs stem from military work in the Second World War. At that time, there were two big design efforts to decide which way to go in doing some of the early work. Canada went one way and the US went another way. It turned out the US then just put a lot more money into it and aggressively marketed more rapidly. England went its own way. It did not get much in the way of sales. It did not come up with a reactor that operates very well. A Candu operates very well.

Mrs. Grier: Then why have more countries not attempted to go at least in that direction, even if they are doing their own program?

Mr. Ahearne: Of the major countries that are doing their own programs, Japan essentially first brought in US technology and built on that. In France, Framatome built Westinghouse reactors for most of its early years, so France went that route. The West Germans started out using pressurized water reactors and Sweden started with PWRs and boiling water reactors.

I think it was that in the early stages, whether or not the argument was correct, and I was not participating so I cannot say, the argument was made that the PWR or BWR is a simpler plant, cheaper, longer and easier to run on a long-term basis, and that it is better to count on someone else to enrich your fuel than it is to count on someone else to make heavy water for you. Those are just suppositions on my part, but it had always puzzled me, in looking at the performance levels of the Candus, which seemed to do so well, why they had not made more inroads. That is what led me to the conclusions I have reached.

From the people I have talked to around the world, it is a very competitive market. Once a country's industry truly opts to go one route, it now becomes a question of protecting your own industry, building your own industry. They have gone down that line, just as Canada–Ontario–has invested so much talent in bringing the Candu along.

It would be an equivalent question to: "Why doesn't Ontario build a pressurized water reactor? Why don't they buy a reactor from Westinghouse?" There is a Canadian General Electric. Why do they not start building boiling water reactors? The reason is that Canada really knows very well how to build a Candu. Similarly, these other countries now know ve well how to build those other things.

Mrs. Grier: Is there any difference in t difficulty of long-term disposal of the waste fro a Candu reactor that uses natural uranium opposed to a type that uses enriched uranium?

Mr. Ahearne: I am not an expert on that sid so I will just have to answer as a physicist. I not think so, because the hazard really associated with fission products. Fission pro ucts come from the fissioning of the uranium ar whether it is uranium in enriched fuel or uraniu in natural fuel, the hazard itself is there. Th amount of hazard per volume is probably less. has to be less in the Candu fuel because t amount of fissionable uranium per volume in t Candu fuel is less. That is what being natur uranium, natural fuel is. But as far as the actu elements that turn out to be the hazards a concerned, they are the fission products. The are the same.

Mrs. Grier: You did not cover the issue decommissioning.

Mr. Ahearne: No, I did not.

Mrs. Grier: Have you any comments to mak that you think might be helpful to us in trying assess the implications of future costs of decon missioning or the kinds of estimates we are no being given for decommissioning?

Mr. Ahearne: I cannot really help you ver much because very little has been done abo that, other than to try to make estimates and th estimates vary. In the US, for example, estimate for decommissioning of a 1,000-megawatt rea tor can run anywhere from US$80 million t US$400 million.

The uncertainties are driven, I think, by tw major factors. The first is that no major react has ever been decommissioned, and then second what level of return of use will be demanded Since no reactor has been decommissioned, tha issue has not been decided either, so they ar really pretty wide ranges.

It is one of these nagging issues that lie around, but the general consensus is that sinc the radioactive part of the reactor–the highl radioactive parts are sensitive fuel elements Spent fuel disposal, the disposal or processing o waste is the hardest issue. For the rest of it, sinc the materials have much lower half-lives, it i more a problem of being able to find som low-level waste site that can take all of that stuf and also the problem of transportation an worker exposures and the difficulties of makin sure you do not get too high work exposures, tha

type of problem, as opposed to this geological lifetime issue with respect to spent fuel.

1650

Mr. Charlton: I have just a couple of very brief questions. A couple of tables in your presentation showed us the relative performance records of the various reactors. You are obviously watching this thing on a year-to-year basis. Two things: (1) Have you seen significant movement up and down those lists in terms of performance; and (2) are there indications that nuclear reactors of any type or of all types decline in terms of their capacity factor as they age?

Mr. Ahearne: To take the second first, the general trend is that they tend to level off and, if they are declining, it is only slightly.

The answer to the first one is that the big change, if you looked across any time scale, is that if you had looked at this kind of list 10 or 12 years ago, you would have found Japan with about a 40 per cent load factor. An enormous difference is the tremendous rise in Japan. That was because the Japanese made a very deliberate decision at the top of the government that they were going to put an enormous effort into improving the quality of their operation and a tremendous effort into maintenance.

They lead the world in pre-maintenance in the sense that, for a long time, they have had a program where a reactor comes down for maintenance whether or not it needs it. Every year they take every reactor down for a period and go through everything. They do much more systematic replacement of parts that might be wearing out just to keep the factor up. They have concentrated much more than most countries running those types of reactors on what is called water chemistry, worrying about making sure they understood the effects of the water on corroding various parts of the equipment.

Mr. Charlton: You mentioned–and I did not catch the whole comment–that Pickering 1 and 2 were not on the lists.

Mr. Ahearne: They were way down. That is because they were out.

Mr. Charlton: Right. To what extent can we expect the similar need to retube Candu reactors to impact on their overall performance rating as compared to the rest of the world?

Mr. Ahearne: It is obvious that if you take a reactor out for a year or two years, that has a very negative impact on its performance rate; that is certainly true. I know that one of the big issues that Atomic Energy of Canada Ltd. and Ontario Hydro devote a lot of effort and time to is looking at when they should retube and what they can do to prevent early retubing. That is clearly a very major question, since a retubing accident is one of the serious accidents in an accident analysis sequence for the Candus, as well as just the sheer economic costs.

Mr. Charlton: To put that question another way, some of the other reactors around the world that you have on this list–you have done it two ways here, but you have a top-10 list in both cases, where you have other reactors from around the world–stack up favourably with Candu and some of them are well down the list. Are any of those reactors in the international community going to have the kinds of circumstances with major two-year or three-year shutdowns?

Mr. Ahearne: Yes. Maybe not two to three years, but certainly several years or at least a year. In steam generators, particularly Westinghouse reactors, because there had not been enough focus on water chemistry, the tubes–and there are thousands of small tubes inside the steam generators–begin to corrode and plug. They have to plug off that tube because otherwise it might leak. If a certain percentage of those tubes get plugged, the steam generator has to be replaced, and that can easily take a year.

Mr. Charlton: I guess the bottom line is that only time is going to tell us how they shake down over a real, full lifetime.

Mrs. Sullivan: I was also going to ask questions similar to Mr. Charlton's relating to the load factors. I was interested in some of the things you had to say about resistance to purchase of Canadian or other technologies and the queries you raised about nuclear costs. Yesterday, the Canadian Nuclear Association appeared before the committee. Unfortunately, the chart I have in my hand is undated and unreferenced but the association shows that combining fuel, operation, maintenance and investment costs, Canadian designs are significantly cheaper on a cents-per-kilowatt basis than just about any other technology other than France; France comes closest. I wondered if that reflects what you have seen and heard.

Mr. Ahearne: As I tried to reflect in what I said, what I have heard is that it is almost impossible to make an accurate cross-country comparison because of the different ways that countries assist their utility industry and their nuclear industry. The general sense I and the people I have talked to over the last five years have had is that there is no fundamental

difference. Far more important are the intangibles. It is not really the intangibles; it is the financing terms that are far more important.

For a new country entering the field, how much knowledge will be transferred turns out to be far more important than the operating costs of that particular plant. The countries which are most concerned about the operating costs tend to be countries generating a lot of electricity, tend to be countries with several nuclear power plants and tend to be countries that are building their own.

Mrs. Sullivan: That is interesting. I was on a trade mission to China and I appreciate what you say about the Chinese being very interested in technology transfer. That would happen whether it was a nuclear plant or a feedmill. They also have substantial hydro power, and I assume their cost comparisons would be made against available hydroelectric.

Mr. Ahearne: They have a very large amount of coal, in fact, and coal tends to be one of the sources they would be more interested in developing.

Mrs. Sullivan: One of the limiting factors you did not talk about was operating safety. Do you not see that as a factor in an external sales decision?

Mr. Ahearne: A comparison?

Mrs. Sullivan: Yes.

Mr. Ahearne: I do not think that is going to be a very major element. It is hard for this not to sound facetious. About the only reactor for which that would be a major issue would be if the Soviets wanted to sell an RBMK. With all the other reactors, there are enough countries running them which are happy with the way they run and which believe they are running safely that it would be very difficult, I believe, to make that big a pitch. If you are trying to sell to a country where they believe safety is a major issue, they are probably not going to buy a nuclear power plant anyway.

Mr. Richmond: One of the issues which has cropped up on occasion before the committee is that Ontario and Ontario Hydro with, as you know, the completion of the Darlington nuclear station will become overreliant on nuclear power and overreliant on one–nuclear reactor–technology. Do you have any opinion or sense of that?

Mr. Ahearne: On the issue of overreliance, the number I got from Hydro's document was 43 per cent nuclear, I think. I would have termed that more balanced than overreliant. I think th TVA back home is overreliant on fossil fuels.

1700

On the issue of a single design, yes, tha certainly is a question, but I guess I would answe it by saying France essentially is relying on tw designs in the 1,300 megawatt. They have abou 30 at 900 megawatt, same design, and about 30 a 1,300 megawatt, same design. The 1,300 megawatt design is an upgrade of the 900 megawatt design. Clearly, they are also at risk i that.

Most countries have pressurized water reac tors and BWRs. In the sense that the fundamenta reactor technology is very similar, that is wh steam generator problems turn out to be a hazar for pressurized water reactors. They are liftin PWRs no matter who manufactured them. guess for myself, I would not–it is certainly concern. When you only have one particula design, obviously you put a lot of effort int making sure you have that design constantl being looked at. You have research going on t make sure that you stay abreast of any precursor that might indicate there might be new problems.

The Acting Chairman: I just have on question myself. We are in this massive account ing in numbers and trying to figure out what i capitalized and what is not. I understand tha most American reactors are depreciated over 3(years as opposed to Hydro's practice of depreci ating ours over 40. Do you have any thoughts o what number may be more realistic?

Mr. Ahearne: Let me separate two thing there. The depreciation life of the reactor is decision made by the local utilities commission That is not always 30 years. That can even b shorter. That is how a utility is going to decid how the rate is going to be determined. State individually set those rates and they are no uniform. The 30-year licence is what mos reactors in the US are licensed for. Some reactor are licensed for 40 years. That is really a differen issue and I am not familiar with why utilit commissions go about setting those rates. I hav noticed that recently in one case there is a argument on whether it should not be 10 years.

The Acting Chairman: It is a great problem for the committee when we are trying t determine what actually costs less and we ar trying to determine all kinds of things that I think are beyond me in understanding most of the time. I appreciate your thoughts. On behalf of the committee, I would like you to thank you fo

appearing before us and sharing a lot of valuable information.

Mr. Ahearne: You are welcome. Thank you very much.

The Acting Chairman: Excuse me. We have one more question that just arrived here.

Mr. Ahearne: If you do not mind, I will start packing my bag.

Mr. Richmond: Just for the record, I know when Lewis Yeager and I met with you at lunch, we mentioned this, just to wrap things up. One of the issues that has cropped up in our press up here, as I am sure it has down in the United States and Washington, is this business of the greenhouse effect. Would you care to offer any observations in terms of what this concern might do over the long run to the value or demerits of nuclear power?

Mr. Ahearne: Sure. Obviously, one of the big arguments in favour of nuclear power all along has been the near-term environmental advantages. You have to say, assuming there is no accident, clearly the pollution from a nuclear power plant is much less than the pollution from a fossil-fuel-burning plant. In fact, in most places it is sufficiently small that you need very elaborate measuring devices to detect it.

The greenhouse warming concern is the first major issue that seems to raise the question that perhaps fossil fuels ought not to be burned. Acid rain was an issue of perhaps fossil fuels ought to be much more expensive when they are burned. You have to put a lot more control systems on to make sure you move the SO_2 and move the NO_x. Removing the CO_2 at the moment looks to be extraordinarily expensive and you still end up with an enormous amount of CO_2, and what are you going to do with it?

Nuclear power is being revisited by large numbers of groups, both internationally and in North America. Many environmental groups are beginning to rethink their opposition to nuclear power. I do not think it is as acute here in Canada, but certainly in the United States there is a real caution, that one has to make sure one understands why nuclear power got into all the trouble it got into before one gets enthusiastic about it again. I think many of the problems that nuclear power had in the United States did not appear here in Canada; that is, the Candus appear to have been built well and seem to be running well.

The Acting Chairman: Thank you. I know you have a car waiting for you. Have a good trip.

Mr. Ahearne: I hope there is.

The Acting Chairman: Our next presentation will come from Ted Thexton, an adviser from the uranium and nuclear energy branch.

DEPARTMENT OF ENERGY, MINES AND RESOURCES

Mr. Thexton: I should start off by saying that although I am with the uranium and nuclear energy branch of the Department of Energy, Mines and Resources in Ottawa, today I am wearing my international civil service hat.

Just to start off, perhaps I should give you a bit of background about who I am and why I am here today. I have spent a long time in the nuclear industry in one way or another, about 29 years, half of that in technical areas, but the last half doing economic and policy studies and that sort of thing.

That has led me into studies of the International Atomic Energy Agency in Vienna and the Organization for Economic Co-operation and Development Nuclear Energy Agency in Paris, particularly working on economic studies. That also led me to spending two years as the head of the nuclear development division, one of four divisions in the Nuclear Energy Agency in Paris. I came back about two years ago from that, but I am still very involved with that organization and have quite a number of contacts with my international colleagues.

Based on that international experience, your staff asked me if I would come and talk to you today on how the Ontario nuclear program compares with programs in other countries. Many of the comments I am going to make to you today will amplify or reinforce some of the comments you have just heard from Mr. Ahearne. Maybe in question period I can, if nothing else, amplify a little bit on those.

Your staff again suggested that I address these half a dozen topics, and I am going to go through them fairly quickly. I hope to leave lots of time for you to deal with questions on things you are particularly interested in. This deals with some of the issues Mr. Ahearne was talking about.

By the way, in the handout you have, you have most of these slides, although the information is sometimes in a different form. The information you have is in tabular form for this one and it shows Ontario Hydro on it, as well as Canada as a whole. It shows that right now Ontario Hydro has about 45 per cent or 47.5 per cent of its electricity coming from nuclear power, close to 50 per cent.

By the year 2000, it is expected to again be in the 45 per cent to 50 per cent range; that is, it will go up to about 60 per cent when Darlington

comes on line. But with no new nuclear installed for the rest of the century–an assumption I am making–within Ontario and load continuing to rise, then the nuclear share will fall off. It will come back to about the 45 to 50 per cent range.

The question you are asking is, does Ontario have too many of its eggs in one basket? This slide is saying if it does, so do several other countries. France and Belgium are well above the Ontario rate now. Sweden, even with its determination to phase out nuclear power, is in that same range. Switzerland is close and Japan is likely to get up into that same range. Certainly, they planned an aggressive program that will continue expansion well into the next century, although as Mr. Ahearne said, public concern is starting for the first time to become an issue in Japan. In fact, the Japanese were asking the Canadian Nuclear Association for information on its public relations program: "How do you deal with this sort of issue in Canada?"

1710

Mrs. Grier: Identify the subversives first.

Mr. Thexton: And make sure that the energy committee is on the list.

Mrs. Grier: Right.

Mr. Thexton: Actually, it was not, but I think you knew that.

Mrs. Grier: Thank you.

Mr. Thexton: One thing I wanted to talk about while I was talking about that last subject was the question of standardization. In France, as Mr. Ahearne said, they have 34 900-megawatt reactors. They are almost the same design; that is, they changed some things in that series while they were building the reactors, but basically all 34 are of the same design. The question is asked: "What happens if a serious problem shows up in one of those and you have to shut down all 34? What an impact on your country."

I think the French would respond by saying: "We don't think that risk is very high with the experience base we now have. We don't think there is likely to be something so profound that we would suddenly find out that would cause us to shut down all reactors in that line. On the other hand, when some effect does show up, like some component beginning to wear out more quickly than we expected, we find that in the early reactors and are able to go through and make the corrections, the repairs, the refurbishment on the later reactors during routine maintenance outages, before they cause a major forced outage."

There are risks, no question, but there are benefits, and the French at least would tell you that the benefits outweigh the risks.

Dealing with the question of reliability, yo have seen other graphs like this and I am n going to spend much more time on them. They a have some different parameters. This one dea with reactors greater than 500 megawatts, so leaves out some that were on Mr. Ahearne's lis This is to September 30, 1987, and there a other dates around, but they all show pretty muc the same thing in the sense that Candu reacto are pretty common in the top 10 or 15 wor units.

Let me go back for a second. Let's look at th Japanese reactor, for example. It has a 99.4 p cent capacity factor. The Japanese have bee doing wonderful things with capacity factors, b that reactor will have a shutdown for refuellin and maintenance of approximately three montl in the next calendar year.

Light water reactors are not refuelled o power, so if you have a year when they do n have to shut down–they shut down every 12 to 1 months generally–if you have a year when the do not have to refuel, then you can get hig capacity factors, but you will not get that high capacity factor on a continuing basis. Som people are running them with relatively sho refuelling outages and doing very well wi them, but they will not run that high for ve many years; certainly not a bunch of years in row.

Rather than looking at individual-year stati tics, it is much more enlightening to look at th lifetime performance, because that is where yo are seeing what your return on investment is ove the whole life of the reactor. Again, you can g slightly different variations on this kind of char I think the CNA gave you one yesterday. Well, have a different time period.

This is to the end of September 1987, whic happened to be the last one that I had plotted up. think theirs was probably to the end of March, s the numbers and the order would change a bi But again, the story comes through that thos Candu reactors are running very well to consi tently get that many up in the top on a lifetim basis.

You can look at the same kind of thing othe ways. This is on the basis of reactor type. PHW is what, internationally, they are inclined to ca Candus. They think we are kind of funny givin them the rather parochial name of Candu, so m international colleagues like to call them pressu ized heavy water reactors. You can see that, as whole, they are doing very well compared to th others.

You can look at it on a country-wide basis. Mr. hearne did some of that. In the chart in the ındout I have given to you, I have taken this list rough quite a few more countries. Oh, I guess aybe you do not have the handout. It looks like is just being passed around at the moment.

What you can see here is that the top four ountries all have lifetime capacity factors within oout two per cent of each other, all right around) per cent. Then you have a drop of about 10 per nt to the other countries, and they phase down om there. Those top four countries are really ing very well indeed. Canada would be closer the top of that list if Pickering 1 and 2 had not en out for so long.

On the other hand, I do not omit them from this nd of a statistic because that is fair ball. If the actor has a problem that calls for it to be shut wn, to be refurbished for some long time, then at has to be included in the statistics. After all, u are paying your money for lifetime electrici- generation, so that is what we have to mpare.

I have to say the Finns are doing a wonderful with running their reactors. They have just ır reactors, but they do a superb job of erating them.

Mrs. Grier: Yet they are dropping down in ir percentage of nuclear power by 2000.

Mr. Thexton: Yes. Again, they are dropping wn in share because they are not building new ctors. They were just about to vote to add two w reactors when the Chernobyl accident curred. They shelved their nuclear programs at t time, and a colleague from Finland whom I l with often tells me that the discussion is just rting to come up again, raised by the industrial wer users, who are saying, "Looking at the ernatives, we think that we should go back and e another hard look at nuclear power."

All I want to summarize on the question of ability then is that the utility has chosen a ctor type which has clearly demonstrated its lity to operate with a very high capacity tor, very high system reliability, and it is rating it very well. You need those two ngs. You have to have a reactor system that operate that well and you have to operate it l to achieve it. Ontario Hydro is doing very l in both those ways.

One of the things that I was going to mention, n my international perspective again, was when I was working with the NEA, we were stantly pulling together international commit- to study various topics, often with the International Atomic Energy Agency in Vienna. One of the studies we did was on load factor.

The chap from the IAEA whom I was dealing with, a Swedish national, actually, wanted very much to get an Ontario Hydro person to chair that working group. He wanted that because of Ontario Hydro's experience and performance. In fact, Ontario Hydro is constantly being asked to supply people to these committees. People say the thing about Hydro is that it does not just sit on its laurels and put up these capacity factors. They are constantly analysing their results; they are constantly analysing why they are doing well or why they are not doing well.

That information is very valuable to the other people, so they are always asking for Ontario Hydro to participate in these studies. In fact, Hydro has told us that it could have a very large fraction of its staff working in Vienna at any one time if it answered positively to all the requests. Actually, the chap who did chair that committee was subsequently called upon by the IAEA to spend a year with the agency reviewing nuclear operations around the world; not just Candu reactors but other types.

1720

I would like to move on to the question of safety and I should start off by saying I am not a safety expert and I do not intend to spend much time on this topic. But I was very pleased to hear Mr. Ahearne comment to you earlier, when he was asked whether safety can be a selling point, that essentially most reactors are safe.

Reactors have different characteristics and the designers designing safety systems have to adapt to those characteristics. Candu reactors, for example, react a little bit more quickly to certain perturbations, so the control systems have to be faster to respond to that and the safety systems. But you can design for that. It is sort of the same thing as saying that if you had a braking system for a sports car, it would not do the job for a big transport truck. That is obvious. You can design a safe braking system for a big transport truck to the same safety standards as for the small sports car.

Those kinds of differences are talked about sometimes but the real answer in the international circuits is the feeling that all of the reactor designers have pretty well matched the characteristics of their reactors to their designs or the designs to the characteristics and they are all pretty well safe.

Candu has some safety advantages. The separate moderator system is an important one. The light water reactors just have a big pot, a big

pressure vessel, and the coolant that goes into that acts as both the moderator and the fuel coolant, so it is all hot and under pressure. In the Candu, those functions are separate and that allows the designers to put instrumentation and control circuits and so on into the low-pressure, low-temperature system.

That means there is less risk that those systems would be ejected from the reactor vessel because of some mechanical failure; that is, in a pressurized water reactor they could be pushed right out from the system pressure. That would not happen in a Candu, but again this is a difference that designers have to account for. Some make it easier for our designers and some make it more difficult, but they can all do it.

There was a lot of review of safety after Chernobyl, and I think it is fair to say that the conclusion was that virtually all the western reactors are really very safe. The key factor is operator training. Many, many of the significant incidents that have occurred are because of operator error.

Again, Canada is rated very highly in the international circuits for its operator training. I know of a number of utilities in foreign countries that are anxious to get involved with Ontario Hydro on training program reviews because of the excellent international reputation that the utility has. I think, but I am not certain, that Ontario Hydro probably has more simulators per operating reactor than any of the other countries. That is a very important training feature.

The only direct safety comparison that I could think of internationally was a fairly recent one where the Netherlands, which also was about to order a new reactor system just at the time of Chernobyl–it was within about two days of being voted on in its parliament–is now back looking at the whole nuclear system. They are seriously considering Candu, and safety because of Chernobyl was a big factor in their questions.

They had a very serious study between the Candu and the UK's PWR Sizewell D, which is sort of the latest of the PWR design types, done by the UK in conjunction with American Westinghouse. It is considered to be an extraordinarily safe design in that some people think there may be an inordinate number of bells and whistles on it. The Netherlands concluded that the Candu was at least as safe as the Sizewell design, so on that international comparison, it has come out well.

I am not going to spend more time on it. You have Hare and the operational safety review team report, the IAEA Osart review of Pickering, rely on for more information.

The only other thing I would note is that IAEA has made observations in its internatio studies that safety inevitably correlates clos with operating performance. We have seen fr the capacity factors that the operating perf mance is high, so that is another indication safety.

Very quickly, this slide–I just came across it is a bit of old data going to 1985–is showing kind of operator exposure that our operators in maintaining nuclear power stations in vari countries, and Candu comes out very well the Again, if you are maintaining low exposure your operators, it is because you are operatin clean and a good system, which correlat according to the IAEA, with safety.

I want to turn to economics. First off, I wo reiterate what Mr. Ahearne said to some of y questions, that it is extremely difficult to international comparisons on costs. In the NE we are at the moment in the process of doin third study on coal and nuclear cost in OE member countries. We did the first one, p lished it in 1983, published an update in 1986 will publish another one next year in 1989.

What we found as we were doing these stud was that because of the differences of real cost different countries, partly because of regulat effects but more because of real cost differen in labour and materials in different countri and most of all because exchange rates do always reflect the real difference in value fr one country to another but when you do th cross-country studies you are pretty well lock into choosing a date and using the exchange ra that applied at that date–we concluded that should not put a lot of store in trying to a "What are the costs of generation in one coun versus another?"

What we concentrated on again was the cos nuclear versus the alternatives. We conside oil and gas in the first of these studies, but quickly found as we consulted the utilities t they were saying at that time that they could believe oil and gas would be economic over 30-year or so lifetimes that were being cons ered for these studies. Oil and gas may competitive at any given time, but on a lifeti basis, not so. So we concentrated just on coal nuclear.

This graph is just showing the kind of range costs we got, all normalized. It simply illustra that nuclear costs tend to be lower but there overlaps. In most countries, where the nucl

ɔsts went up, so did the coal-fired costs, but ıere were a few places where coal is cheaper ıan nuclear.

730

You do not have this next slide in the handout. will leave a copy of the report that has all of ese data. It is a quick glimpse at what the costs e. You can see variations from country to ɔuntry. Canada C stands for central Canada. It ally means Hydro is showing very low nuclear ısts, about equivalent to France but, again, do ɔt put too much faith in the absolute numbers. ıe main thing is that most of those countries are owing an advantage to nuclear over coal.

You have this next table in your handout which ows what that ratio is. In other words, for elgium you have 62 per cent higher life-cycle nerating costs for coal-fired power than you do r nuclear power.

The Canadian data: Hydro has, of course, its vn estimates of coal and new nuclear plants. In stern Canada we used Nova Scotia coal plants d the Candu 600 of the Lepreau 1 type. For estern costs, we used Alberta coal against that me Lepreau type of Candu. Alberta was the ly place that came out unequivocally with a ıch lower coal cost than nuclear. It has just out a unique situation there, where it has od-quality coal that can be mined at the surface ar a water source and near load centres. From t point of view, it is God's chosen province. I not think there is anywhere else in the world th that combination.

Mrs. Sullivan: Would Australia be close?

Mr. Thexton: Yes, parts of Australia would close. In fact, you are right. I am really nking of those countries that participated in the dy. Australia has no nuclear because some its l is so cheap.

The United States data: I do not want to spend ɔt of time on it, but the US gave us a set of data ed on the kinds of very long construction edules they were then experiencing. We went k to them and said, "Realistically, nobody is ng to build new generating stations in your ntry if those are the kinds of construction es you are going to face up to." They agreed said, "Okay, we'll give you revised numbers the central case based on more realistic struction times," and we extrapolated to the er two.

That really said in the United States that lear was at least competitive pretty well ɔughout. You see articles in the press that say contrary, that coal is cheaper than nuclear v in the United States. There are a couple of reasons for that. A lot of those comparisons are based on today's numbers, that is, the cost of the electricity being generated this year.

You have seen Hydro curves, I am sure, that show that coal prices increase with time and nuclear stays fairly level with time. So if you are near the beginning of the lifetime, the nuclear plant may be more expensive than coal. In later years, it will be cheaper than coal. These are averaged over the lifetime by a so-called levelized cost process.

Mr. Richmond: Do those coal costs include scrubbers?

Mr. Thexton: Some of them do and some of them do not. It depended on the country in this study. We defined certain ground rules, discount rates and lifetime capacity factors, but they specified themselves whether scrubbers were to be included or not. Some did and some did not. That information is in the report and I will leave it behind.

I think the only other point on that, and I will show you another slide you do not have, is that I have some preliminary results from this latest study we are doing now. I did not give it to you because, as I say, the results are preliminary. I did not want to provide them to you in written form before they had been finalized. The green lines are the latest study compared with the yellow lines of the previous study. In some countries the nuclear advantage has increased and in some it has decreased.

The price of world coal is lower now than it was three years ago, so we expected that the nuclear advantage might have fallen significantly. As I say, in some countries it has and in others it has not changed much. Only in the Netherlands has it apparently fallen to an advantage to coal, which is rather interesting, because in the Netherlands they are still showing significant interest in building nuclear power for economic reasons.

In the United States data, I have just put arrows there because they did not have their results in yet. Their representative on our working group told me that he expected it was going to show that nuclear had a significant advantage on the eastern seaboard, would just about break even in the central US and coal would have an advantage in the western or Rocky Mountains part of the US. The only conclusion I should draw on that is that when Ontario Hydro says coal is more expensive than nuclear, it is not alone: A lot of other countries are finding exactly the same thing in these kinds of studies.

Spent fuel management: I should go quickly through this because you had a good presentation on that already today. I just wanted to flag that the Canadian program is very similar to what is going on in much of the world. Most countries plan to store fuel until after the turn of the century because they do not have very large volumes and there is not a pressing need to hurry through and start to dispose of it, so they plan to store the fuel at reactor sites in pools or canisters or some sort of surface storage for quite some time.

Most countries have decided that eventually they will plan on geologic disposal, some in salt, some in clay formations, many in hard rock, as we are in Canada. Only two countries have chosen sites so far: the United States and the Federal Republic of Germany. Both those countries are having problems with public response to having chosen a site. Some of them have told me that they wished they had followed the same route we did of first deciding on the concept and discussing that in a rational way without coupling that with the much more emotional decision of whose backyard the site will be located in.

I said the route Canada took, but several other countries have gone that same way. In Sweden several years ago, before its utilities could load fuel into its last several reactors, it required that they prove that there was an acceptable concept for disposal of that waste. They had to do a study and provide documentary evidence to convince their government there was an acceptable concept; not a site, but a concept. Switzerland has gone through the same process and completed it just this year. That is a very similar process to what Canada is doing.

I had thought that Sweden might consider that its research and development program was more advanced than that in Canada because it has been going on for a long time. It has been doing work in an abandoned mine, the Stripa mine, for quite a few years. Canada much more recently started its work in the underground research lab you saw pictures of earlier.

However, the Sparrow committee, the House of Commons standing committee on energy, mines and resources–its report called Nuclear Energy: Unmasking the Mystery, just came out a few weeks back–visited Sweden, among other countries, and the Swedes said they thought the Canadian program, because it had a lab into virgin pluton rock, was more advanced. In fact, Sweden intends to build that kind of an underground research laboratory itself, but has not done so yet.

1740

I phoned a colleague in the NEA last week preparation for this and asked him for his vie on how he thought the Canadian spent fu management program rated against the progra in other countries. He said he held it in very hi regard. He thought Canada, along with Swed and Switzerland, probably had the best progra in waste management.

He suggested that the proof of the high rega that not just he but the international communi holds for the Canadian program is the number Canadians who have been asked to chair participate in international committees on spe fuel management, both in analytical studi where Canada has done some excellent work international recognition and in its experiment program.

In summary on waste management, I wou say the Canadian program is at least as advanc as those in other Organization for Econom Co-operation and Development countries and is providing strong international leadership some ways.

The last topic I will deal with is decommi sioning. Mr. Ahearne touched on that as wel We did a study while I was at the NEA. The data are from a paper which I subsequently ga in Vienna on the cost of decommissioning. Wh I did in this case was to go to quite a number countries' data, which were published or provi ed to us at the NEA for various purposes, wi very simple normalization. I was not able really normalize them tightly but I pulle together the estimates for quite a large number decommissioning jobs which were being co sidered or being analysed and we plotted th distribution. That slide should say "millions dollars"; I think I wrote that in by hand on yo copies.

What we are saying is that really, with all th uncertainties with international comparisons discussed earlier and with the differences assumptions from one study to another, th range of estimates is not too bad: something lik $200 million, plus or minus 50 per cent. At th stage of the game, that is not a bad basis. Th says there is reasonable consistency in the co estimates around the world for what decommis sioning will cost by the experts in the field.

That is not as surprising as it may seem to yo What we found as we did this study was th virtually every step that will have to be done i decommissioning a large power station has bee done in one way or another already, either durin maintenance or refurbishing work or in decom

issioning of small demonstration reactors or search reactors.

What that tells us is that the technology is there ow; that is, if we had to completely dismantle a rge power reactor immediately, we do not have depend on developing any new technology. It es not say we would not benefit from some proved technology because we would; but we not have to wait for some technological eakthrough. That also means that people can timate roughly what it is going to cost because ey have done the steps so they can come up ith some reasonable cost estimate. They know ow many cubic yards of concrete they have to ar down and dispose of, how many pipe cuts ey have to make and so on and so forth.

The bottom line, though, I think is not so much ow much it costs to do it but what the impact of at cost is on the electricity consumers. That ts a little tricky, but we took data similar to hat I just showed you and we compared them ith what countries told us their nuclear generat-g costs were for two approaches: one, disman-ng the reactor essentially immediately after it ut down, within the first few years after utdown; two, waiting 30 years and then smantling it.

One of the variables we always get arguments out is what discount rate to use; that is, when u are storing money up during the time the actor is operating and putting it into some sort an investment, it is earning real interest and u can use that earned interest to help pay for commissioning. You have to take that into count when you say, "How much money ould I be setting aside each year?"

There are big arguments about what discount tes to use, and to get around those, I have otted it over a very wide range of zero to 10 per nt. That is real. That is above the cost of flation. In other words, a 10 per cent real scount rate with five per cent inflation is uivalent to about 15.5 per cent nominal interest tes.

I believe that something like two to five per nt would be a reasonable range for this kind of rpose. That says that on this chart you would e that add somewhere between 0.5 and 2 per nt to the cost of electricity generation; a little ss than that percentage-wise to the consumer, cause of course the utility has a bunch of other sts to add on top of the generating costs that pear in your electricity bills. I have had a quick ok at a few countries to see what they are tually setting aside and any I saw fell roughly within that range, somewhere between 0.5 and 2 per cent.

The other finding from that study was that the volume of the radioactive waste for decommissioning you would have to deal with, a point that Mr. Ahearne alluded to, is similar to the volume of waste that you would have generated, the low-level waste you would have generated during the reactor operating life. In general, you are saying that you would have to roughly double the size of the repository that you are putting these low-level wastes in; similar technology, similar volumes. It is not some order of magnitude problem in extra waste being generated. That exact number varies, depending upon what you assume about compaction and whether you melt down the steel and so on and so forth, but as a rule of thumb it was about that.

The bottom line in decommissioning is that the technology is available, affordable and generates manageable quantities of waste. I think there is a better chance that the costs will go down in real terms than up as new technology comes along to make the job even easier in the future. Even if I am wrong in that and the costs go up, even by a factor of two per cent, you can see it is not going to have much impact on electricity consumers.

Just to summarize, my intention today was not to suggest to your committee any real answers to the questions you are deliberating, but rather to try to show you how Ontario Hydro compares with other countries. The short answer to that is that it compares very well indeed. I think Canadians have every right to be very proud of their nuclear program.

Somebody alluded to this earlier, that Canadians tend to be very shy about taking credit for things they do well. I think this is an example. I know from my own perspective I had a much higher regard for the Canadian program as I looked at it from the international circuit, from Paris, than I ever did from in Canada.

I will be happy to answer any questions.

The Acting Chairman: Thank you. I am sure we have some.

Mrs. Grier: Just on the last two slides on the decommissioning, on the very last one, the real discount rate and the percentage operating cost, you said that most countries you have looked at were within the range of two to five. Do I take it that Ontario Hydro was one of them?

Mr. Thexton: Yes. My recollection is that the amount they charge in Ontario Hydro depends upon the reactor. They did not start collecting funds for decommissioning as soon as they started Pickering, so they did not have as long a

lifetime over which to be collecting it. I think it is about 1.5 per cent, something like that. In the Bruce reactors, I think it is more like about 0.5 per cent, maybe 0.6 per cent.

1750

Mrs. Grier: In the previous one on the distribution of decommissioning cost estimates, how many countries were involved?

Mr. Thexton: I will leave a copy of that paper. I believe it was about eight or nine countries, so a number of countries had more than one estimate there. I must say I have forgotten. I have the paper with me, though.

Mrs. Grier: But it was a fairly broad range of experience that led to these estimates.

Mr. Thexton: Yes, it was a fairly broad range of experience. On that committee, I think we really had the best and most experienced people in the world helping us prepare that study, some people who have done some really good work in France and the United States. Mr. Liederman, who was here earlier today, was on that study, and as you heard, he has now been asked to chair this committee the NEA has.

It is a very interesting group. I think they have seven or eight countries in it now. The ground rules are that each country that goes into the group has to have some sort of decommissioning program under way and they can all exchange information on everybody else's program. They can attach people to any of the other programs they like. They can obtain sample materials and so on. But they have to have a program of their own to participate. It is a very interesting program. Mr. Liederman is now chairing that.

Mrs. Grier: Thank you very much.

Mr. Charlton: One of the recurring themes that we get from Hydro and the DSPS document, and from a number of the other groups that have made presentations to us, is the need to maintain the Canadian nuclear industry in a viable state. To date, nobody has really told us precisely what that means. I guess, from my perspective, the question becomes, what is it that we have to do, ultimately, to maintain the Canadian nuclear industry in a viable state? For example, a number of the presentations we had earlier today talked about the perspective of the potential, in the short run, for a number of things around conservation, cogeneration and a number of other alternatives, but the view was expressed that the only long-run, viable, secure supply is nuclear.

What is the immediacy of this stated need to maintain the nuclear industry? If we, as a committee, in our consultations around this 20-year planning process were to find that we f there were viable packages of conservatic industrial, cogeneration and other independe generation that could meet Ontario's needs f the next 20 years at the cost or less than the cost nuclear, with the option in mind that perhaps 2010, if we have then run-out of other resourc Hydro might wish to proceed to develop furth nuclear resources, is the concern that the indus would by then have died a quiet death som where? What exactly is it we are talking abou

Mr. Thexton: Let me try to answer that a lit bit from wearing my international hat. A numb of countries in the NEA have in recent years be very concerned about exactly this kind of iss you are hearing in Canada. The Japanese, w their strong program, have been asking the NE to do a study on the problems of maintaini nuclear technology in what they call "a stagna era." The Germans are very concerned about th same issue. So there is a lot of concern.

The kinds of things they are saying are that appears that in their countries they are having hard time attracting new, young, bright people the industry because they do not see opportu ties for long-term, rewarding careers the w they used to. They are going to other industri They say they are worried about being able maintain the kinds of specific technologie particularly the quality assurance, quality contr kinds of technologies, that are necessary in ord to build plants.

I have discussed this with some of them a have suggested that in a country like the Unit States which has about 100 reactors in operatio they should be able to keep their technology ali on the basis of refurbishing their existing plant operating maintenance, experience and so o For a country that has a program the size of t United Kingdom program, the size of t German program or the size of the Canadi program, they probably cannot.

If they go through a stagnant era with no orde in their country for very many years, they wou probably end up losing their indigenous capabi ty. They would not, however, lose the ability build nuclear power. I think that any of the countries, including Canada, could come ba 20 years later, but they would not be doing it wi their indigenous technology. They would going and buying it from one of the countries th had stayed in the game–Japan or Korea perhap

Of course, with a technology that is unique t country such as Candu in Canada, it would me the Candu technology would not survive th kind of scenario, because a utility coming in

at time would be unlikely to try to develop the chnology back up almost from scratch. Having t it on the shelf for 20 years, it would not be a odern technology. You would have to pull it up om the grass roots again. They would be much ore likely to go with a technology that was then ailable.

Mr. Charlton: The question that comes out of hat you have just said is that in a low period, a stem the size of the US system can likely aintain itself just in refurbishing and maintence. Then you made a couple of other ferences to systems that likely could not do at. I would assume you are saying that the nadian nuclear industry, and more specifically e Ontario nuclear industry and the maintenance d refurbishing that may go on around Hydro's clear program, which is the predominant part the Canadian nuclear program, would not be ough on its own.

Mr.Thexton: I think that is right. If there are Candus ordered for another 10 or 20 years, I n sure that any utility, in this case Hydro, ould take all reasonable steps to preserve its erating reactors and continue to maintain ose.

Their normal maintenance people would, of urse, be kept on staff. Those skills would be aintained. But they would find it very difficult go out and buy nuclear components such as essure tubes for retubing unless they kept that dustry alive artificially somehow. They would d it difficult to find a Canadian manufacturer the specific nuclear pumps that needed to be placed.

After a while, they would be going to the nericans, or as I say, to the Japanese or some her country that had kept its nuclear technology ve and buying those components from them. when you came along to try to place an order a new reactor, you would find that you did not ve enough of the basic industrial skills left in e country.

Again, I am trying to answer this, as much as I n, from the international perspective. These e the kinds of arguments I am getting from my lleagues in other countries. I do not really want talk very much about Ottawa's views on this, t I could say those views are certainly not ntrary to the kinds of arguments we hear in nada.

00

Mr. Charlton: Let's throw a couple of other estions into this mix or turn this question ound a little bit. John Ahearne just told us, and hink fairly clearly, that the realistic prospects of any significant numbers of Candu sales in the international community are somewhere between very limited and nonexistent, that the major places where nuclear construction is likely to go on in any significant amount all have their own indigenous industries, and that we may sell the odd one here and we may sell the odd one there, but there is not going to be any significant growth in the international potential for Candu.

What does that mean in the context of this phrase, "maintaining in a viable state the nuclear industry in Canada," and more specifically Ontario? What would Ontario Hydro really have to do to maintain that industry in a viable state? How many reactors are we going to have to build to really keep that industry running?

Mr. Thexton: I do not think anybody can give you a precise answer to how many would have to be built. I can tell you this: when I was in France, I was listening with a little bit of amusement to the French nuclear industry saying that it had to sell three reactors a year to keep its industry viable. The reason I smiled at that was because some years ago in Canada I heard exactly the same story. Well, Canada did not sell three reactors per year and after a while certain people said, "Now I guess the Canadian nuclear industry is dead." They said, "No, actually we could probably survive if we had about 1.5 reactors per year on average."

Even that has fallen and the industry is still there. It is getting a bit weak but it is still there. The French are going through the same thing. The French are now down to about one reactor per year. They have chosen that number somewhat artificially perhaps, but it is a number that their government has apparently been convinced is required to keep the industry fully viable. So let's say something in that order.

Mr. Charlton: Okay, let me be a little more specific. Over roughly the last 25 years, not even quite 25 years–by the time Darlington is finished it will be 25 or 26 years–we will have built 20 reactors in Ontario and that is the base on which the industry has been maintained. We have had some limited international sales thrown in throughout that period, but the base upon which that industry was maintained was 20 reactors in just over 20 years, or one and a bit a year.

Assuming, just for a moment, that Hydro's most probable projections are anywhere near being in the ballpark for the next 20 years, even with the somewhat disputed figures, from both sides I grant you, about the amounts of conservation, industrial cogeneration, independent generation and so on, the perspective in DSPS only

looks at one additional major nuclear development in this province in the next 20 years, so it is four reactors in the next 20 years, compared to 20 in the last 24, 25 or 26 years or whatever it exactly works out to. Is the nuclear industry going to survive that?

Mr. Thexton: You are pushing me to look at my Canadian evaluations more than purely international ones. I believe that Canada will survive and will maintain a viable nuclear industry at a rate of sales of something less than one per year. My view is that if Ontario Hydro were to launch a new nuclear program within the next few years, that would keep the industry hanging in there. It would maintain its capability until those orders started to come in. Those orders would start to hit the shops some time in, let's say, 1993, 1994, 1995, maybe even a little later than that; it depends on when Ontario makes the decision to proceed.

It may very well be that New Brunswick will order a Candu 3 before that, and that will keep things going a bit. It may well be that one or even two international sales might come along in the not terribly distant future–not this year maybe, but within the next two or three. I think right now, with the industry already established, let me be clear: that would not be enough to build an industry if you did not have one. But if it is already there, some real business and the promise that there is a probability of a few more coming along, I think, will keep that industry intact to the turn of the century.

My assumption is that beyond the turn of the century, within Canada, there will probably be very close to enough sales on an ongoing basis, maybe enough by itself, to keep a viable industry. It will not take very many export orders to put it over the top. One can dream of a number of different scenarios. Certainly when people look at the amount of energy that the world is consuming and the number of countries that are trying very hard to move up the scale, one can see general arguments for a lot more electricity being installed; so you can see out in the next century, scenarios that would say there would be quite a few orders. We are not saying we have to get that to survive, but I think if we can survive until that time, there may be enough orders going along that nuclear becomes at least an industry capable of ongoing survival, and possibly quite an attractive industry to be involved with.

But let me not try to do too much forecasting beyond the turn of the century. I argue a lot with people who do such forecasts, and I agreed very much with a comment somebody made earlier today that you should be planning on the basis trying to make sure you have the capability allowing the kind of future you would like have happen to happen, and then you try to pu much flexibility into your planning as possibl

I wonder, while we are talking about t subject, if I could take a moment to respond t question that was asked of Mr. Ahearne: "W have more Candu reactors not been sold?" I ha looked at this for a long time, and I thi although there are many factors, the answe really pretty simple.

Back in the late 1950s and early 1960s, wh American technology was being developed a exploited in the United States and starting to sold around the world, the world mood ab science was euphoric. Science was wonder and the United States science was at the peak the pinnacle. People did not require demonst tion reactors to be operating to prove that t technology would work. Just on the basis that United States was prepared to share it with th after President Eisenhower started the Atoms Peace program, many countries jumped right the bandwagon, and that included virtually the industrialized countries: France, Germa Sweden, even Spain.

During that era nobody was prepared believe that Canada was an industrialized co try capable of a high-technology product. Ca da is still largely thought of in the internatio world as a resource-based country–agricultu wood, mines and so on–so we did not have t reputation. We had to build Pickering a operate it for a few years before we co demonstrate that we had that technology.

By that time–we are talking now into t mid-1970s–the Organization of Petroleum E porting Countries oil embargo had precipita the world recession and, just like Ontario, ev country in the industrialized world and many the developing world found that either they h overbuilt capacity and they were not buyi anything–not coal, not gas, not oil and certai not nuclear–or else, if they wanted to, they c not have any money to do it. There was no mar at that time. I think that is the prime reason t there are not Candus around in a lot mo countries.

1810

Mrs. Sullivan: I must say I found this l exchange very, very interesting. Following up a question that none of us picked up on with M Ahearne relating to the economy of scale, spoke of a study showing that the typical util argument about economy of scale in nuclear h

ned out to be invalid. Almost as a follow-up, I wondering whether that conclusion therefore kes the Candu 3 indeed more attractive and ether that may be the route whereby the nadian industry will find an out.

Mr. Thexton: I think the Candu 3 potentially n important route for the Canadian industry to ld up on, but I do not think it is because of the onomies of scale. The data that Mr. Ahearne s referring to are very interesting. The economies of scale relate to early designs of y simple, small reactors compared to later igns of very complex, very large reactors. I nk if somebody were to separate the data on nplexity, he would find that it correlated ter that way than with size.

do not think anybody has learned to roll back laws of economy of scale, but what they have ne with the Candu 3 is to come out with some y innovative construction methods and de- ns to facilitate those innovative construction thods, which will certainly allow them to uce the costs a lot. They think that the cost of wer from a Candu 3 will not be much more n from a Candu 6, but they have not yet had opportunity to design a Candu 6 which orporates all of the ideas they have generated h the Candu 3. When they do, that Candu 6 ght–in fact, I believe, will–produce cheaper wer than the Candu 3.

That does not mean there is no marketplace for Candu 3. In fact, as they said, a Candu 6 is v about 750 megawatts. That is too big a unit many Canadian utilities, and it is certainly too a unit for a number of foreign countries, reloping countries. Even where a developing intry has the grid size to be able to absorb that e of a unit, as we know, it has a very difficult e financing that size of a unit.

t seems to a lot of people that the IAEA has n a very strong supporter of the Candu 3 for ictly this latter reason. They say it is the only ctor they have seen on the horizon that is ed on proven technology, because it is a ight extrapolation of the very successful, ger reactor; one in which they can have some fidence in the costs, because it is based on the ven technology that is coming along, which ild be afforded on a financing basis by some of developing countries. It could give those intries an entry into the nuclear utility iness. I think it is more the absolute financing t, the absolute capital cost, than the economy scale.

do not think that very many of the developed intries would find many places where a unit as small as 300 megawatts or even 450 megawatts would be the preferred unit economically. They talked about it in the United States, and there may be some states where, because their utilities tend to be so small and they have had so much bad experience in sharing nuclear units, it is conceivable that some utilities–whatever the day is when the United States starts to go back into nuclear power–might again find it easier to get in, to get it started again, if a small reactor were available. But for the long run, I think for big, industrial countries somewhat larger units will make sense.

The big 1,200-megawatt or 1,300-megawatt units–there are a lot of people, who know a lot more than I do, saying that maybe they are sufficiently complex that their reliability is not going to be as high as the smaller units and, therefore, that might be too big. We may not see too many units of that size built in the world, but I do not think the Japanese would agree to that at this stage. Certainly the French would not.

Mrs. Sullivan: I did want to ask one more question, but maybe we should–

The Acting Chairman: Mr. Richmond has a quick one.

Mr. Richmond: Mr. Thexton, just following on from Mr. Charlton's line of questioning, in view of your vast Canadian and international experience in nuclear power over the years, do you have any ballpark figure? Mr. Charlton was questioning you on his concerns about the viability and ability of the Candu industry to survive. Is there any ballpark figure that is bandied about?

How much money has the federal government and the various–primarily the federal government from the late 1940s on when it first got into the nuclear power development program–is there any ballpark figure on how much in the way of public funds have been committed to this in Canada?

Mr. Thexton: Yes, I think those data should be publicly available to you. My recollection is that the total research and development expenditures in as-spent dollars, up to date, are something like $5 billion. That, I believe, includes the cost of some demonstration plants like Douglas Point and Gentilly 1.

By international comparisons, I can tell you that is very little. That is the lowest of any of the industrialized countries, according to data published by the International Energy Agency of the OECD. I do not have those numbers with me and they are not all in my head, but Canada was the only country other than the US that was successful in commercializing to this extent an

ongoing nuclear technology, and spent less than the countries that adopted light water reactors.

Mr. Richmond: When you get back to Ottawa, if you have data of this nature in your files or in your office, could you send them along to us?

Mr. Thexton: Yes, I think I can. I will have to make certain that is all in the public domain, but I believe it is. In fact, certainly the IEA data are, and that is a much better source than Ottawa anyway. Why do you not go–I can send you the reference certainly–to the published data in the IEA?

The Acting Chairman: I think our time h expired, Mr. Thexton. Thank you very much f appearing before us. You have helped sol some of our problems and probably raised sor more questions, but thank you very much f appearing.

Mr. Thexton: Thank you. It was my pleasu

The Acting Chairman: The committee adjourned until 10 o'clock tomorrow mornin

The committee adjourned at 6:17 p.m.

CONTENTS

Tuesday, September 27, 1988

SELECT COMMITTEE ON ENERGY

airman: Carrothers, Douglas A. (Oakville South L)
e-Chairman: McGuigan, James F. (Essex-Kent L)
wn, Michael A. (Algoma-Manitoulin L)
rlton, Brian A. (Hamilton Mountain NDP)
eatz, Sam L. (Durham East PC)
er, Ruth A. (Etobicoke-Lakeshore NDP)
trundola, Gino (Willowdale L)
, Michael C. (Windsor-Walkerville L)
nciman, Robert W. (Leeds-Grenville PC)
ith, Larry (Frontenac-Addington L)
livan, Barbara (Halton Centre L)

ostitutions:
ousella, Tony (Dovercourt L) for Mr Matrundola
ner, Norah (Durham West L) for Mr. McGuigan

rk: Manikel, Tannis

ff:
ue, David, Consultant; with Passmore Associates International
hmond, J. M., Research Officer, Legislative Research Service

nesses:

m the Town ofr

m the Society of AECL Professional Employees:
lrews, Dr. H. Robert, Central Issues and Energy Planning

m the Chalk River Technicians and Technologists, Local 1568:
phy, John, Chairman, Energy Committee
nch, Joe, President
, Jeff, First Vice-President

m the Bridlewood Residents Hydro Line Committee:
ter, Judy, President

m the Waterpower Association of Ontario:
lokin, Ronald, President
er, David M., Vice-President

From Atomic Energy Canada Ltd.:

Lawson, Don S., President, Candu Operations

Dormuth, Dr. Ken W., Director, Geological and Environmental Science Division, Waste Mar ment Program Responsibility Centre

Liederman, Joel, General Manager, Candu Operations, Montreal, and Manager, Decommissic Programs

From Resources for the Future:

Ahearne, John F., Vice-President and Senior Fellow

From the Department of Energy, Mines and Resources:

Thexton, H. E., Adviser, Nuclear Power, Uranium and Nuclear Energy Branch; Vice-Chair Nuclear Energy Agency Committee for Technical and Economic Studies on Nuclear Er Development and the Fuel Cycle, Organization for Economic Co-operation and Develop

Ontario

No. N-22

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy

Electricity Demand and Supply

First Session, 34th Parliament

Wednesday, September 28, 1988

Speaker: Honourable Hugh A. Edighoffer

Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the ba together with a list of the members of the committee and other members and witnesses tak part.

Reference to a cumulative index of previous issues can be obtained by calling Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Servi Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toron M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Wednesday, September 28, 1988

The committee met at 10:16 a.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY
(continued)

Mr. Chairman: Can I call the morning ession to order, please? I do not have a gavel, so will pound the desk with my fist. That makes it fficial, I suppose.

The topics we are going to be discussing today elate primarily to purchasing power. Our first itness is Jim Osten, who worked on a report for e Ministry of Energy entitled The Economic npacts of Purchasing Electricity. Mr. Osten, erhaps I can turn the floor over to you. I think ou are going to be summarizing this report for s, and then we will have a period for questions fterwards.

DRI ENERGY

Mr. Osten: My name is Jim Osten. It is a easure to be here. I thank you for inviting me. I orked with Data Resources of Canada for the ast 10 years, on the Canadian Energy Service. ne of the projects I did in 1986 was for the linistry of Energy on the economic impacts of ırchasing electricity. I have also done studies r people like Hydro-Québec, the government Newfoundland, the government of Nova cotia and some of the power companies in the nited States.

The topic is to review the study that was done the purchase of power. This was done in njunction with the engineering firm Acres ternational. It involved looking at nuclear sts, hydroelectric costs and approximately 18 enarios in purchases.

If you do not already have it, there is a handout at was prepared. This is the table of contents. I ant to cover an overview of what was in the ıdy; the definitions we used for the 18 enarios, specifically a scenario that looked at a rchase of 2,000 megawatts from Quebec; the sumptions of the study; a summary of the onomic impacts, and some of the conclusions e have reached. There are several exhibits ich will give you a sense of the price sumptions and where the pricing trends were ing.

I spent several days looking for a good map of rth America that had all the provinces and all the states on it. The representations tend to spread out the North Pole, but I thought it would be worthwhile to point out where in North America the hydro sites we looked at are, where the US markets are in relation to the hydro sites and where the Ontario markets are, and of course the Conawapa site on the Nelson River, the NBR–Nottaway, Broadback and Rupert–site in Quebec and some of the lower Churchill site.

The economic impacts of purchasing power are measured by looking at a number of factors. The capacity had to be constructed in each case. We are looking at constructing 1,270 megawatts on the Nelson River, which is Conawapa, we are looking at constructing 7,030 megawatts on the NBR site in Quebec and we are looking at constructing a nuclear plant that would be another Darlington in its cost structure and size. A four-unit plant would be 3,524 megawatts; a two-unit plant would be 1,760.

We also looked at the transmission capacity. The sites in Quebec would require approximately 1,000 kilometres of extra transmission to reach the Ontario grid. The use of the power would be in base-load or intermediate use in Ontario, and we looked at a 65 per cent load factor. The purchased capacity would be on a firm basis, would be brought into the Ontario grid and would provide a diversity of supply for Ontario. That means some construction in Ontario would be displaced and some use of coal or alternative fuel could be displaced by the purchases.

We did look at 18 scenarios. At that time, negotiations had been under way since 1985. There are a number of scenarios, a number of considerations that have been looked at with regard to both Quebec and Manitoba. The basic comparison and the basic economic impacts are going to flow from either constructing a nuclear plant or partaking in purchases. I have put up a simple diagram to show that in terms of the investment, purchases require extra transmission and nuclear requires extra generating facilities in Ontario.

For a nuclear choice, there would be operating expenditures in Ontario. The payments for electricity, which amount to approximately $10 billion over a 20-year period, would apply in only the purchases case. The price of electricity is something that has small but significant effects

on the economic impacts. Ontario rates would be directly affected by nuclear. The purchase price would also have an effect on Ontario rates. It would be worked in as a weighted average.

What we actually did in our methodology, to touch on that briefly, is we ran a macroeconomic model of Canada with the different price levels in it. There is a significant benefit to Canada of having the lower average cost of electricity. We then ran a regional model to see where the expenditures took place. If they take place in Quebec, the impacts are going to be mostly in Quebec; if they take place in Ontario, the impacts are going to be mostly in Ontario. We used a regional model to distribute the national impacts and then we used an energy model to look at how the energy system would operate in Ontario with the different levels of purchases. This would give us information on how much coal would be required, for example, or the operating rate on nuclear plants.

The basic scenarios are defined by several attributes. First of all, we were not trying to duplicate all the work Ontario Hydro had done in its demand-supply options study. We were looking at a specific capacity increment that would be required after the year 2000–4,000 megawatts. In our demand projections, our base case projections, we are looking at a growth rate in Ontario electricity demand of somewhat over two per cent a year. We have been forecasting the last three years a growth rate between 2.1 per cent and 2.5 per cent for Ontario over this period. That growth rate does require a large incremental capacity after the year 2000. The 4,000 megawatts could be achieved in 18 different ways, depending on how much nuclear, how much is purchased from Manitoba and how much is purchased from Quebec.

As I mentioned on methodology, the results were calculated, first of all, on the national level and, second, using a regional model to distribute the effects between Ontario and Quebec. We also checked our results using the interprovincial input/output model of Statistics Canada. Ontario Hydro used a version of this model in all of its calculations of economic impact, which I think it has presented to you. I did a very similar simulation with the interprovincial model, using it directly with Statistics Canada. We came up with results almost identical to what Ontario Hydro had for the same case, which I think is worth while noting because it shows that there was very careful work done both in Ontario Hydro and Statistics Canada.

Third, we looked at sensitivity to purch prices. We realized that our basic assumption purchase prices was only an estimate and looked at prices 20 per cent higher and 20 cent lower to provide a range of estimates to how the economic impact would change at hig prices versus lower prices.

Then we looked at alternatives for equ participation by Ontario Hydro in some of Quebec developments to see what type sourcing arrangements or what type of equi sharing arrangements could lead to lower red tions in the economic impact on Ontario.

As I mentioned, there are numerous scenari There are five basic scenarios. The initial c was essentially a nuclear case with sm purchases from Manitoba and Quebec. We cal that initial case A. If you do get around to readi the report, all of the cases that are based on initial case would be A1, A2, A3 or A4, a similarly for the others.

We had a bulk purchases case which looked purchases of 250 megawatts from Manitoba a several thousand megawatts from Quebec. T large purchases case had a single increment 4,000 megawatts purchased from Quebec. T Quebec case, for which I will be presenti economic impacts, pertained to building two-unit nuclear station of 1,760 megawatts a then purchasing 2,000 megawatts of power fr Quebec. Then we had a Manitoba case wh there is a combination of nuclear and a 1,0 megawatt purchase from Manitoba. The Queb case, I believe, is the relevant one and I turn this.

Assumptions used in all the cases requi estimates of the cost of the nuclear, the hydro a the transmission. The nuclear cost came fr Ontario Hydro studies, which were looked at Acres International, and was essentially that o Darlington nuclear station with four reactors.

The base price of the purchased power assumed to be the cost of the nuclear plant plus per cent, which is a very favourable price Ontario based on conversations I have had w people at the time and since. Certainly that pri is subject to negotiation. We did look at a pri that would be 20 per cent higher.

The cost of the transmission facilities is bas upon specific engineering estimates prepared the time. The hydroelectric construction co were estimated for the Conawapa site in Manit ba and for the NBR complex in Quebec.

Perhaps I can take a moment and talk abo hydroelectric costs. When we looked at the c structure in Quebec of hydroelectric faciliti

ve did an extensive review of all the different ites by name and by their cost estimates and how heir cost estimates had changed. We also went ack and reviewed the cost estimates for the ames Bay project.

There was a chapter in Mr. Bourassa's book, ower From the North, that dealt with the history f the James Bay project. He pointed out that itially they were planning to build four dams, ith approximately 8,000 megawatts of power, t a cost of about $15 billion. When the project as completed, they had built three dams, with ver 10,000 megawatts of power, at a slightly wer total cost. In other words, they had a cost verrun of approximately 30 per cent per dam, ut they ended up with 25 per cent more power nd actually had a cost per megawatt that was bout 25 per cent lower. They still have and are lanning to build the La Grande 1 and add two eaking units at La Grande 2A. They are going to nd up with nearly 14,000 megawatts of power at site where they originally expected to get 8,000 egawatts.

It is an interesting set of numbers. The umbers are not important; the range, I think, is nportant. It points out that when you undertake very large hydroelectric project, one that can volve three or four generating dams–in the case f the Nottaway-Broadback system, about 10 ater-controlled dams as well–you have a risk of us or minus 25 per cent in the actual capacity u will achieve and a risk of plus or minus 25 r cent in the cost. That can be both on the up de and the down side.

030

We used the mid-range estimate. The number r the total development cost of the NBR site as a little over $11 billion in 1985 dollars. If u talk to Hydro-Québec, it may say the number ight be $12 billion in 1987 dollars; it might be a tle higher or a little lower. They have talked in range of 7,870 megawatts. The cost per egawatt would be within a fairly narrow range what we had assumed in this study. It is still sed on the same engineering estimate.

We then used an assumption that economists e to use, which is ceteris paribus; we held erything else constant. We did not look at fferent demand growths and different interest tes; we used a base case and looked at changes the purchase assumption to get the economic pact.

I have a number of graphs, which I am going to ow, that will provide you with a sense of the onomic impacts as the purchases increase or crease and give you a sense of what the pricing assumptions are. I would like to point out six numbers which I feel are very important to the economic impacts of purchasing 2,000 megawatts of power. They start with the Quebec case, D.

The cost of purchasing power in the period from 1999 to 2010 would be $4.7 billion. The $4.7 billion is money that Ontario Hydro would write a cheque for and send the cheque to Hydro-Québec. The economic impact on Ontario of doing so–of having the construction in Quebec, of writing the cheque and sending the cheque to Quebec–would be a negative $5.9 billion over the entire period of 1986-2010. The economic impact in Quebec would be a positive $9 billion.

There are negative impacts on Manitoba, because we would not have any construction in Manitoba, so part of the economic impacts are hitting other provinces. Some of the positive element achieved in Quebec is an increase in the total national product of Canada. In this case, I think those two numbers show there is a potential that purchases of power are good for Canada, but of course they do benefit Quebec the most and do come at the expense of Ontario.

What happens if the price is 20 per cent higher? The cost of the purchases is 20 per cent higher; it now becomes $5.9 billion. The impact on real domestic product in Ontario becomes a cumulative $7 billion and the positive impact in Quebec is $10 billion. Notice that the positive impact on Quebec went up by less than the negative impact in Ontario. The cost of higher electric prices has a negative impact on Canada as a whole. If there were a deal which were to increase the average cost of electricity in Canada, there would be a negative impact. It would be small, but there would be a negative impact on the Canadian economy. This seems to be saying it is good for Canada to have interprovincial trade and it is really good for Canada if the interprovincial trade results in benefits to both the consumer and the producer.

There are some notes which give specifics on these calculations. With regard to the change in employment in Ontario in case D, the Quebec case, at the assumed nuclear plus 10 per cent price, in the year 2010 there would be 32,000 fewer jobs in Ontario. In the 20 per cent higher purchase price case, there would be 39,000 fewer jobs in Ontario. I will show you some plots of how that accumulates year by year.

I draw your attention to the conclusions we reached. These conclusions are the ones in the study that relate to case D, to the 2,000

megawatts. In the discussions we have had before, during and since this project, it would appear that the Nottaway-Broadback-Rupert complex in Quebec is the most likely source of the purchased power. It has not been developed. It would require investments of over $11 billion in 1985 dollars, with the risk factor of plus or minus 25 per cent, and quite likely it would be on the plus 25 per cent side.

Initially, when Hydro-Québec was considering developing the James Bay region, it was deciding whether to develop NBR or the La Grande. They chose the La Grande first. That indicates that there have been some problems with the NBR region, that technical engineering difficulties they encountered caused them to look elsewhere.

The cost of the most favourable purchasing arrangements for 2,000 megawatts of electricity would exceed $4.7 billion in the first 10 years of the agreement; that is if the price of purchased power is based on the cost of constructing nuclear plants in Ontario, using the most-favoured-cost estimates of Ontario Hydro.

If the price is 20 per cent higher, the cost would then be $5.9 billion. The economic impacts amount to approximately a $6-billion decrease in economic activity in Ontario. If you were to double the purchases, the economic impacts more than double. Reduction in economic activity in Ontario would exceed $19 billion. There is something going on other than a straight, linear extrapolation. As the size of dependence on power from Quebec increases, the negative impacts on Ontario increase in more than proportion.

There is a prospect that the consequences of the purchases of power could be mitigated by equity participation, by sourcing some of the construction materials in Ontario and by negotiating a lower purchase price. Hydro-Québec is very unwilling to accept anything that would look like ownership by other than Hydro-Québec. They would not accept ownership or part-ownership in a facility by another province.

To source construction materials, most of the economic impacts of the hydro site are on the labour side. In order to have economic impacts, to have engineers work in Quebec, they would have to be licensed in Quebec. I think there are restrictions on engineers who could work in Quebec versus Ontario. To have construction labour work on a site in Quebec would probably also be difficult. The portion of the construction that is actually materials–it is going to be mostly cement and some purchased fuel–is relative small to the total cost.

In negotiating a lower purchase price, I thi the status of the negotiations in three or four ye has reached a point where the purchase prices a probably higher than what we are talking abo here, rather than lower, is a good indication the chances of success there. However, given those obstacles, if equity participation, sourci considerations and lower purchase price could achieved, it would have a substantial positi impact on Ontario in a relative sense.

1040

There also are ongoing negotiations by Hydr Québec with other provinces and with pow pools and states and utilities in the United State all of which have a different set of economics electricity, some of which would offer a substa tially higher price for power than the co structure in Quebec.

To review some of the central points, I wou first like to demonstrate where some of the ri comes in a hydroelectric site. When you look a levelized cost of hydroelectricity, you typical would assume that the dam will last 60 to years. Anything that lasts 70 years means th you do not have to recover more than three four per cent of the capital in any given year. you have a nuclear plant that is going to have i capital recovered in 30 years, and a hydro da which is going to have its capital recovered in years, you have an enormous advantage in th the capital recovery for a hydro dam is about ha that of a nuclear plant. That is where, on levelized basis, much of the advantage of hydr development comes.

What I have done here is to look at, not th capital recovery or the accounting convention f a standard levelized cost, but what I have looke at is the actual financing cost of the hydro proje and a nuclear project on exactly the same basi We are assuming that there is 100 per cent de financing of each project.

The interest is accrued during the constructio phase and it is also provided for by 100 per ce debt financing. At the point in time when th plant begins operating, the operating compan would pay back the total principal, the tot borrowed amount in 35 equal annual instalmen for both the hydro dam and the nuclear dam They also would pay all of the current intere each year.

When we add in the operating costs, we get financing cost for a hydro project which woul amount to a price of 12.5 cents per kilowat hour–this is in currency of the day. The cost

he nuclear plant in the year 2000 would be 10 ents per kilowatt-hour, and for the period from 000 to 2020, the annual financing cost of an lealized nuclear plant would be less than the nnualized financing cost of the hydro project.

What does this mean? It means risk. When you re Hydro-Québec and you develop a 7,000- legawatt project to export power to the United tates or to Ontario, you have to take that risk for at first 20 years where your financing costs are igher than the financing costs of a fossil-fuel lant. The payback comes after 2020 when your nancing costs approach zero, your operating osts are almost trivial and all the money that you an get for selling power is basically pure profit. ut you have to wait 20 to 30 years to achieve at.

What Hydro-Québec sees when it looks at the nancing implication of developing Nottaway, roadback and Rupert to sell 2,000 megawatts is at it has to find a market for the other 5,000 egawatts and it has to bear the risk of getting an lequate return for anywhere from 10 to 20 years the project. So there is a financing risk when ou have a project that is all capital up front.

One of the reasons they have signed very large ntracts with people like the state of New York to try to shed some of that financing risk and semble a large enough pool of capital so that ey have assurance that they can undertake these ojects and achieve the economics over the tire life of the hydro dam.

In reality, based on the forecasts of continued onomic growth and continued growth in ectricity demand, there is no substantive onomic risk to undertaking investment in dro sites but there is a perceived financial risk.

Let me translate the prices in the study into a nge in 1987 dollars and give you an idea about e dollars per megawatt-hour we are talking out. When we look at prices over different riods and different currencies and different its, there is always a bit of confusion. The sic price for nuclear power in Ontario is based an idealized nuclear plant. As I understand it, tario Hydro is talking about something like ,200 a megawatt for constructing Darlington, current Darlington, and it is talking about ,650 to $1,700 a megawatt for an idealized clear plant. In this study we used an idealized clear plant; so our cost structure is lower than actual experience of Darlington; when we say clear we are talking an idealized plant. That mes out to be something like 3.5 cents a owatt-hour or $35 a megawatt-hour. The dro projects would be in the range of about 2 to 2.5 cents a kilowatt-hour or $20 to $25 a megawatt-hour in actual levelized cost, on a standard levelized function. So the the levelized cost of hydro is a notch below the levelized cost of the nuclear.

Imagine the effect of the purchases on the Ontario real domestic product. We discussed the five scenarios: the initial case, A; the bulk purchases, B; the large purchases, C; the Quebec purchases, case D; and the Manitoba purchases, case E. Case B, the 2,000-megawatt purchase, is in the bold line. Case E, purchases from Manitoba, actually has, because of some changes in assumptions, a slight positive impact on Ontario. When you go from 2,000 megawatts of purchases, which is the bold line, to 4,000 megawatts of purchases, which is the dot, you can see that the impact during the construction period, where there is $11 billion being spent in Quebec, has a significant impact on Ontario; then, during the operating phase, the impacts increase over time. There tends to be a more than proportionate effect of spending money on purchasing power as the size grows and as it accumulates over time.

To show you the similar impact of what happens in Quebec as opposed to Ontario, if you ask the question, "Why would Hydro-Québec and why would Quebec want to pursue sales of power to Ontario or to the US?" 4,000 megawatts of sales can reach over $1.5 billion in 1985 dollars on an annual impact.

The competition in the US export market in our base case is fairly large. What I have shown here are two lines on the graph. The more solid line in the middle is the amount of exports equal to five per cent of the importing region's demand. The dotted line is 10 per cent of the importing region's demand. The Atlantic, Quebec, Ontario, Manitoba and British Columbia exports are shown in different shades.

1050

What we foresee in our forecast, based on current contracts, is an increase in exports from the 40- to 50-billion kilowatt-hour range up to the 60- to 70-billion range by 2000, and then a levelling off based on low reserve margins in Canada. Unless there is a lot more construction than in the current development plans of the provincial utilities, there is going to be a supply constraint on exports of power, which means a fairly tight market. This assumption reflects the need in Ontario to build another 4,000 megawatts and equivalent needs across all provinces of Canada to build more capacity to meet their future demands. There are also long lead times

involved, in that because there are surpluses now, there has been a slow process in improving and providing for those future construction sites.

To comment on the question, "Why does Quebec want to export power to the US?" this is a chart that shows the price of power in the US mid-Atlantic region and the price of power in Quebec, both taken from DRI forecasts. The relationship of average industrial electric rates in Quebec relative to the mid-Atlantic is approximately half. Any time you have a price ratio of 0.5, you are going to see people getting really excited about trade opportunities.

There are also questions raised about Ontario exports and Ontario imports. When we compare Ontario price forecasts for electricity with price forecasts in the east north-central region of the US, we see that during the period of the early 1980s there was a very large relative price advantage for Ontario. That price advantage is narrowing, and the opportunities of either importing power or exporting power are reduced by the convergence of the two prices.

I do have some other slides and some other information available if your questions warrant it in those directions, but at this point I would like to stop my presentation and respond to any questions or comments you might have.

Mr. Chairman: Thank you very much, Mr. Osten. Are there questions from the committee?

Mrs. Grier: I am afraid I need to go back to almost all of your graphs and have a bit more explanation, if I may. On the first one, you assumed a 35-year capitalization, yet you told us that for hydro you were looking at a 70-year payback period. Does that not distort the cost of hydro?

Mr. Osten: Yes, it is distorting the cost of hydro. What utilities will do is a standardized, levelized cost where they levelize the cost over the expected service life of each type of equipment. For a hydro facility it is normally a 60- to 70-year depreciation and a 60- to 70-year service life. For a nuclear facility it will be a 30- or 35-year service life.

However, in looking at the financing costs and to make the point of the risk that utilities have to undertake when they borrow money, a utility cannot borrow money for 70 years. Typically, it will borrow money for 10 years, 20 years or 25 years. I wanted to look at the financing implications of undertaking construction under exactly the same set of calculations.

Mrs. Grier: On the next one, you made some comment about the bold dot, that is, scenario E, as being positive in relation to Ontario's gross domestic product, but you said that was because of some changed assumptions. Does that then mean there were different assumptions in that line than in the others?

Mr. Osten: The question pertains to purchases from Manitoba. Each scenario had a somewhat different total investment, for two reasons. One, the components of the 4,000 megawatts would be different. The investment cost of the hydro sites is slightly different, slightly less than the investment for the nuclear sites. Also, we looked at incremental sites. We always added 1,270 megawatts of power in Manitoba, because they would either develop Conawapa or they would not. We did not have exactly 4,000 megawatts. In some of the cases that is slightly more and some slightly less. The small positive impacts would just be a reflection that Manitoba would construct 1,270 megawatts and sell only 1,000. They are overspending. It is not really relevant to the purchaser's decision. Essentially a B is a zero number. It is just in trying to define everything to fit; and to fit the circumstances there would be slight variations.

Mrs. Grier: Okay. Let me try to understand that. You are saying that Manitoba is going to construct that one regardless of potential purchasers. Does that not then mean that if Ontario was seeking to purchase, say, 1,000 megawatts the analysis of the impact of that purchase ought to be done on the assumption that that project was going ahead anyway, rather than the assumption you made in all of your forecasting that the capacity had to be constructed and that, therefore, the costs were higher?

Mr. Osten: Okay. It is a fair point, I think, if assumptions are made and the scenarios are always of interest. We had to assume that for Manitoba Hydro to be willing to sell 1,000 megawatts to Ontario, they would have to construct sites that were equal to or greater than 1,000 megawatts. The next site in line in their development plan is Conawapa, which is 1,270 megawatts. We assumed that it was constructed in case E, in cases where Manitoba was exporting power and we assumed something different, either not being constructed or other sites being constructed, depending on what was required in other scenarios, but it is lumpy. It is not exact. They do not have a site they can develop that is exactly 1,000 megawatts.

Mrs. Grier: Okay. If they are going to construct Conawapa at 1,200 megawatts, are they constructing it on the assumption that they have to find a market for 1,000 megawatts?

Mr. Osten: Right.

Mrs. Grier: If your study were based on the impact of merely purchasing that 1,000 megawatts rather than on the assumption that either Manitoba or Quebec have to construct major new capacity, as it is, would the results be any different, or would the results be more positive than the study you have done?

Mr. Osten: I see. That is an insightful question. If I can paraphrase it, if there are 1,000 megawatts of extra capacity–

Mrs. Grier: For sale to somebody.

Mr. Osten: –for sale, what would the economic impact be on Ontario purchasing it?

Mrs. Grier: Right.

Mr. Osten: The relative impacts would be much less than what we are showing here. Where we have a solid line that shows a negative impact, it would look closer to zero. It would be a lot less, but we did not make an assumption. We made the assumption that purchases would be large enough that there would be incremental construction.

Mrs. Grier: Why did you make that assumption?

Mr. Osten: That assumption was made because lumps of 1,000, 2,000 or 4,000 megawatts would require enormous construction activity, enormous dedication to resources. People like Hydro-Québec and Manitoba Hydro are not going to undertake construction until they have a market for the power, either domestically or externally. That is a basic view that we have about the operating system of the utilities that work.

Mrs. Grier: Okay, I am missing something. You are saying that there are 1,000 megawatts that are going to be built in Manitoba that are for sale at some point.

Mr. Osten: Only in the cases where there were purchases. We added that incremental capacity above the domestic requirements of Manitoba only for the cases where Ontario was purchasing from Manitoba.

Mrs. Grier: I see. You did not do any analysis of what impact that would have on jobs or the other factors that you looked at.

100

Mr. Osten: We looked at one alternative of case E, where Manitoba would undertake a large project to sell some power to Ontario and to sell some export power to the United States. So we looked at what the impacts were when Manitoba put together a consortium of purchasers and undertook an incremental project that was fully utilized, and the positive impacts on Manitoba were enormous. There were also spillover effects that led to fairly neutral overall impacts in Ontario.

Mrs. Grier: My final question, if I might. A couple of the people who have already appeared before us–AMPCO, I think, was one–talked about the need for a regional approach rather than a provincial approach to power. I wondered if you could comment on that.

Mr. Osten: I do have a bias in my thinking about interprovincial trade and interregional trade on electricity. I am very much for it. The reason for that is I do forecasts for a living. I forecast up to 2010. As you know–and I am sure you have seen a lot of forecasts–reserve margins tend to go to zero or negative if you do not build anything.

As a consumer and as somebody who has observed industries in operation, I think it is clear that there are a lot of problems when the reserve margins decline. People do not get the quality of service that they want. One of the ways you can ensure that people are going to get the quality of service they need is if there are interconnections. We have looked at things like the western grid. The western grid was never announced as a big policy push in western Canada, but a lot of those interconnects are being constructed now.

There are more interconnects going between Alberta and British Columbia and between Manitoba and Saskatchewan. There are more interconnects going between BC Hydro and California through the Bonneville system. There are prospects of more interconnects from Labrador into Newfoundland, from Labrador into Quebec and from Quebec into neighbouring provinces. We are talking about grids between Prince Edward Island and New Brunswick and between Prince Edward Island and Quebec.

It is wonderful. I love it. I think it is the greatest thing that can happen. They have to be justified on more grounds than just that they are a good thing, but there is certainly a real positive there for me.

Mrs. Grier: Sorry, one other question I did want to ask about the graph on electricity exports, where you say they level off after the year 2000. Is that assuming free trade or not assuming free trade, or assuming the deal we now have?

Mr. Osten: Essentially, in the forecasts that DRI had been making since the agreement was entered into, we had initially in 1987 assumed no free trade agreement. But once it was signed in

January 1988 and once the process was made through the US Congress, we assumed it in our macro cases and in our energy forecasts.

The export forecast does assume free trade. The next 10 years of electricity exports are not going to be materially affected by whether or not the free trade agreement goes through. In the forecast after 2000, the levelling off is really based on the current development plans in Quebec and development plans in Ontario and elsewhere that require more of the power to be used domestically in Canada.

When we do the free trade analysis, we have an impact that there is more industrial activity in Ontario and in Quebec and more aluminum production. More of the energy-intensive industries will locate in Canada and export manufactured goods as opposed to energy and as opposed to electricity.

Mr. Argue: Coming back to the price feed comparison chart you were discussing with Mrs. Grier, I would just like to go over again the assumptions you touched on during your testimony, which make it very clear where the assumptions came from for each of these three scenarios that you charted out here.

Mr. Osten: There is a table in the back of the study that has all the numbers that were used. You might have it there on the page you are touching, the last page of numbers in the report. If you look at the last column–I am referring to the last page in the report–there is approximately a $2-billion or a $2,000-million figure for the year 2000. If you were to divide that number by the capacity of the nuclear station by the load factor. You would get approximately 10 cents per kilowatt-hour as the price. Again, that is composed of three components. It is the 100 per cent debt financing, it is the debt payback on the 35-year basis, it is all the interest payments and it is the operating costs; so it is the financing component of nuclear power.

The gas line that starts at 11 cents a kilowatt-hour is nuclear plus 10 per cent, which is the assumed purchase price in the agreement. I believe from discussions with people this is somewhat low for what has been considered since or what has been under negotiation.

The dotted line in exhibit 1 is the price of hydro power calculated in exactly the same way, using the assumptions in the study.

Mr. Charlton: But the numbers you have presented here were based in the nuclear example on Ontario Hydro information?

Mr. Osten: Right. Ontario Hydro's idealized nuclear station.

Mr. Charlton: I am curious about why yo selected a 35-year depreciation period whe Hydro depreciates its nuclear plants over 4 years.

Mr. Osten: We wanted to make somewha different assumptions to what Ontario Hydro dic so we looked at several specific assumptions, load factor of 65 per cent rather than 70 per cer and a 35-year period rather than either 30 or 40 There was just a decision to look at some of thes factors and come up with a specific assumptio that was not identical with Ontario Hydro's.

Mr. Richmond: Mr. Osten, from you analysis, it would seem that if Ontario in th future were to enter into major purchases wit our provincial neighbours strictly on economi terms, from these various graphs it could not b justified in view of the impact upon th provincial product. It would seem that if purchase were to be entered into, there woul have to be political, economic, reliability an other factors that would motivate the province t sign such an agreement. Would that be you impression?

Mr. Osten: I would have to say that is an exac reading of the study. The economic impacts o Ontario are very large and very negative. Th economic impacts on Canada as a whole ar slightly positive if the average price of power i lower in Canada as a whole. That is a result o doing the macroeconomic simulations.

Mr. Richmond: Since you specialize in thi type of forecasting, have any of the America states that have contracted already to purchas Quebec power in New York and New Englan done these analyses, and from your experience how have they rationalized or justified pur chasing power rather than building generatin capacity on the US side?

Mr. Osten: The question is how would, say, state like New York or Massachusetts approacl this problem if it was in the identical position tha Ontario is at the present time. I think the answe is that there are concerns about nuclear wher nuclear is on the referendum in the Massachu setts election this fall. Several nuclear plant have run into problems, Shoreham and Sea brook. They really have no nuclear option in th US. Their nuclear option is at a cost facto several times higher than that expected b Ontario Hydro. They also have no hydroelectri option in terms of their generation facilities.

They have looked at coal, and they hav environmental restraints on using anything that i going to have a level of pollution. The cost o

scrubbers becomes very high and the siting of the plant becomes very contentious. The local utilities are unable to make investment because of concerns that they will not be able to recover their costs. Private utilities have to go to equity markets and capital markets for money. If they cannot guarantee that they can repay that, they have difficulty in getting financing, putting the deals together.

There also has been an emphasis towards deregulation in the US electricity market, to have utilities buy power and to have utilities encourage cogeneration. When the utilities put out for bids, sources asked private suppliers to provide power to them. They asked for bids and they were offered 30,000 megawatts of supply. None of that is in existence, but there were companies that were willing to take the risk of building power plants for supplying. So the utilities are in a dilemma, a quandary. They are tied, so they cannot do anything.

The option that they have and the very real option is to purchase power from Quebec and hope, by specializing in what it is they are good at, to sell goods to Quebec and to others to pay for the purchases. It would really come down to a similar situation for Ontario, if it felt that it could sell its own goods and products into Quebec or to other markets in a sufficient amount to offset the cost of the purchases. That is certainly debatable.

1110

Mr. Richmond: Your analysis did not take that into account?

Mr. Osten: We did not look at that part. In the interprovincial input-output model, if you increase activity in Quebec, it does draw in imports from Ontario, and there are more sales from Ontario into Quebec, but they are very small. As to the proportion, if you could call it a recapture rate, if you spend a dollar in Quebec, how many cents does Quebec spend in Ontario just by the natural working of the market? Ontario probably provides something like 5, 10 or 15 per cent of Quebec's goods. A dollar spent in Quebec is going to lead only correctively maybe to 5, 10 or 15 cents spent in Ontario.

In trade between Canada and the US, the ratios are somewhat higher. What we would call the marginal propensity of import in both countries is relatively high with respect to the other countries. Certainly in the case of the US, when the US spends a dollar in Canada, it tends to get 20, 25, 30 or 35 cents back in terms of increased purchases in the US. When the US looks at economic impacts, it finds them to be negative, but it has no real alternative in environmental considerations and other things that are affecting its decisions.

Mr. Charlton: I want to go back to your responses to some of the questions that Mrs. Grier asked, just to be sure I fully understood your response. All of the scenarios you worked out and all of the economic impacts with which you concluded in those scenarios are all based, as I understood by what you said, on the assumption that negotiation leads to construction. I think what you said was that if Manitoba or Quebec were just to say, "These negotiations are giving me a headache; let's go and build the damned stuff and throw the power out on the market for sale," the analysis of the economic impacts then changes dramatically.

Mr. Osten: If Hydro-Québec were to undertake a large construction project, as it did with James Bay, which was partly on speculation that markets would grow and that it would be able to sell the power, then the price would be cheap. To give you the specifics of what happened in the case of the development of the James Bay project, Hydro-Québec ended up with an enormous amount of surplus power. At some point in the early 1980s, they were running water through the dam, just spilling the water because they could not find markets for the power, even though the cost of producing that power would be tenths of a cent.

They undertook what was called an electroboiler program in Quebec. Take a paper company, for example. They offered to pay the paper company to install an electric boiler. They then guaranteed that for five years they would sell electricity to the paper company at 90 per cent of the cost of equivalent fossil fuel. This clearly was a large expenditure on their part and they clearly were undercutting the price of fossil fuel. That was a guaranteed price, irrespective of what the price of oil and gas went to. They did that to sell something in the range of maybe 1,500 or 2,000 megawatts of power into their own domestic market to substitute for oil and gas.

They also undertook interruptible sales into the US and into Ontario and other provinces to try to find markets for the power. They very actively marketed firm contracts. When you look at the proportion of power that Quebec exported in the 1980s, the proportion that is firm versus interruptible, a very high proportion of its exports was interruptible. The transfers between provinces and the exports to the US were on an interruptible basis. Interruptible power is very cheap. They were just trying to dispose of the power.

What happens as a consequence of overbuilding and having to sell power below its true cost is that the utility ceases to bill until it moves the surplus. At the present time, the paper companies that have electroboilers in Quebec are converting back either to gas or to heavy fuel oil because electroboiler program is ending and Hydro-Québec has indicated in its internal documents and in all its submissions to the National Energy Board that it is not going to continue because it has better alternatives for that power. They are getting market prices and they are getting firm contracts in the US.

You have a period of three to five years maybe where you could get cheap power because somebody has overbilled, but that cheap power is going to be used, it is going to be put into exports and it is going to be sold where it can be domestically. Within a very short period of time, it will not be there.

If you make a provision for the period from 2000 to 2020, based upon somebody having surplus power, it may hold true for three, four or five years, but it will not hold true for the whole 20 years. When we were looking at 20-year purchases, we looked at firm contracts based on incremental construction to support that firm contract.

Mr. Charlton: But there were some firm contracts in the period you are talking about.

Mr. Osten: About a quarter of the electricit trade was traded under firm contract.

Mr. Charlton: The bottom line in all of thi is, ultimately, in terms of how you approach thi whole question of purchase, that you have to loo at all of the things you have looked at in you study, but to some extent you also have to loo at, in the case of Quebec, for example, what th reasonable prospects are in terms of the Quebe government's deciding to build those facilitie anyway as an economic development tool, whic is what it did with James Bay 1. That is why the built it on spec. It was an economic developmen tool as opposed to an electrical energy tool. T some extent, to see the full picture, you have t look at both sides of that question.

Mr. Chairman: Are there any further ques tions? Mr. Osten, I would like to thank you o behalf of the committee for coming in an speaking to us, summarizing your report to u and discussing it with us.

Our next session is in camera with Ontari Hydro. I would ask anyone not connected wit Hydro or the committee to leave the room. W are not being inhospitable, but we would like t have an in camera session.

The committee continued in camera at 11:2 a.m.

AFTERNOON SITTING

The committee resumed at 2:15 p.m. in room 228.

Mr. Chairman: Our first witness this afternoon is Multistream Power Corp. Mr. Headford, I guess you are heading the panel. I wonder if you could introduce your colleague for the benefit of Hansard.

Mr. Headford: This is my colleague, Jay Shepherd, who is in attendance with me.

Mr. Chairman: Do you have any audiovisual presentation?

Mr. Headford: No.

Mr. Chairman: Then I will turn the floor over to you. We have about an hour. If you will go through your presentation, we will pause for questions and so on afterwards.

MULTISTREAM POWER CORP.

Mr. Headford: We are privileged and happy to be before this committee. I think the most useful role we can play is to give the committee a bit of a look at a participant in private power, one of the players. We are a reasonably new player in the game. Over the session we will speak to who we are and why we got into this business, what signposts we are looking at and basically our interpretation of what is going on in the industry, our problems, our desires and perhaps what we can do in the overall picture.

Multistream was formed in the early part of this year. It consists of a group of private investors who purchased an existing corporation and an existing site for purposes of producing power currently and, as part and parcel of this transaction, three potential sites which can be developed.

The amount of money raised by the private investors in the corporation was about $2 million to put us into business. We have a line of credit at the bank of $600,000. The individuals involved are personally responsible for a good part of the debt.

The way we got into this business was largely because we saw it as a good, safe business, an attractive business, a business that had an element of conservatism in it and some good long-term growth. To be candid, the class 34 was the original attraction. In introducing myself, I have been involved in tax shelters in the past and the class 34 was really a lure. It is unfortunate that it can no longer be passed through to limited partners. I think that has been a real body blow to the industry. It has certainly slowed us down in our planning.

A bit on my background: I graduated from the University of Toronto law school in 1972. I was called to the Ontario bar in 1974. I practised law until 1978 and then I became involved in the mining business. Basically I have been in and around the junior mining business since that time. I worked with the Dickenson group of companies for several years and now I am a private individual. I have been putting together flow-through share deals and tax-driven investment over the past few years. I have been involved in approximately $50 million worth of financings since mining flow-through shares took off about three years ago.

My colleague Jay Shepherd, who is with me today, is a lawyer. He graduated first in his class from Osgoode Hall in 1978 and was called to the Ontario bar in 1980. While at the bar he simultaneously studied for his master's degree at the University of Toronto Law School and he achieved that goal in 1981. He was an undergraduate in philosophy at York and he has been the recipient of many scholarships and prizes.

1420

In 1980, Mr. Shepherd joined Blaney, McMurtry, Stapells, Aarons and Watson and started its tax department. It is now quite a large tax department and he is in charge of that, of course. He has been involved in many tax-related and tax-driven projects, needless to say; an estimate has the projects he has structured and been involved with at about $300 million.

He has been involved in the independent power industry since 1970 and is presently an executive officer and director of the Independent Power Producers' Society of Ontario, the Conservation/Renewable Energy Industry Council and the Canadian Wind Energy Association. He currently teaches income tax law at Osgoode Hall law school.

The other participants in Multistream are individuals similar to Jay and me, involved in the area of venture capital, tax shelters and vehicles. We are all very experienced in raising money for various projects. We are all very interested in this whole area. Our operator is Michael Dupuis, a young man of 34; we are very proud of him as an operator. He is very knowledgeable in small hydro and has worked on several small hydro plants. One of the

stations that Multistream owns is the Galetta power station on the Mississippi River. That station was purchased from Ontario Hydro and renovated by Mike Dupuis and his father and brought into its current state of operation, which we are very happy with and which is quite successful. I guess he turned the sow's ear into a silk purse.

As I started to say earlier, we came into this business and the class 34 was there. We were going to package small hydro projects for limited partners and do the operations for them. That has been taken away. When we started the purchase of Galetta power, that was our prime objective. It was taken away. We then made a decision to stick with the small power business because we had all become very intrigued by it. We formed Multistream and invested in this way.

We are in the business now and the way we view our position in the business is that we are positioned to expand. At the current buyback rate and in the current state of the industry, we are not rushing to expand; we are just watching and keeping our eye on it all. We will expand when we see that the signs are there. That is basically who we are and where we come from.

Jay is going to have a few words about how he sees the industry and then I think the most constructive use of our time would be if you wish to ask us any questions to get a vision of how a small company that has come into this area views it, etc.

Mr. Shepherd: The Multistream deal started as a tax deal and ended up not being a tax deal. It is now a company that has access to money and sites, but it is being cautious because it needs policies, in essence. In a minute I will get to what draws financiers to an industry like this and why there is a lot of caution in the financial community about small hydro right now, and indeed about private power generally.

You have already heard, I guess, from a lot of people on independent generation, so you have heard about what the potential is for it. I can talk only from my own experience as a lawyer active in the area. I have about 80 megawatts of projects currently on my desk actively going ahead. The estimates that I have heard, some of which are before this committee, are 5,000 megawatts of small hydro and amounts of gas cogeneration too high to estimate realistically. With regard to wind power, I do not think the wind people are even talking about what the possibilities are in Ontario, because until buy-back rates change they are zero.

As the rates go higher, of course, the size of the supply increases. That is pretty obvious. There is not a lot of private power. It is also good power generation, better than many other options. It is private capital: you are not using the government's money, you are basically paying for power when you need it instead of well in advance of when you need it. It is very efficient; the private sector generally can operate things more efficiently.

Galetta station is a good example of that because Galetta is producing some six or eight times as much power as it did when Ontario Hydro ran it. There is a very short turnaround time for private power production. One of the problems faced by Ontario Hydro today is the 15-year planning cycle. For most private power projects, you are talking about sometimes as little as a year, rarely more than four years, to go from start to finish on a project. That gives a lot of flexibility.

It is power that is dispersed around the province, which has one advantage in that it is much more reliable than central generation. It helps system integrity and flexibility. That also has advantages in local economics. There are a lot of local jobs created when private power facilities are introduced into an area. Certainly virtually every one of the projects I am involved in is in northern Ontario. That is where a lot of the small hydro sites are anyway and that is where a lot of the cogeneration will be coming from and where we need the jobs.

With all of those nice, wonderful things, I guess the question is, why is the financial community interested in the sector and why is it not more interested in the sector? Right now, there are a whole bunch of people from Bay Street dipping their toes into the private power pond and seeing whether they think it is cold or warm and whether they want to go for a dip. If they thought they were going to make a whole lot of money at it, they would not be dipping their toes in; they would be jumping in very fast. Financiers tend to be a bit greedy.

Right now, they are cautious. The financiers need certainty; that is very fundamental to what a person with money does. When the investors in Multistream, for example, decided how and whether to proceed with private power, they were doing a calculation, all of us were doing our own individual calculation as to how big were our risks and what sort of rewards we could predict. That is all based on certainty. If you do not know what the rules are going to be, what the numbers are going to be, then you

annot assess the balance between risk and eward. Financiers, being essentially chicken, vill assume the worst rather than assume a sort of conservative average projection.

430

You cannot underestimate the importance of ertainty in bringing the private sector into ower generation. The financiers will take a ood deal less rate of return if they know what it s going to be and if they know what the ground ules are for the game. If they have doubts about he ground rules or if they know what they are ut are afraid they are going to change next veek, then they will require either a lot more noney, a lot more rate of return to be involved r, more likely, they will say: "I'll sit it out. I ave other things I can do with my money. I'll vait until I know what the rules are and then I'll o back in."

For example, we were playing around, talkng about Multistream and what it was going to pend its money on in the next couple of years nd we were talking about possible ways of tructuring contracts with Hydro. We said that if ve projected that the present value of the rates ver the next 30 years for buyback of power vere, say, nine cents a kilowatt-hour, which is robably not unreasonable, then undoubtedly a ompany like Multistream would accept eight ents or maybe less than eight cents on a flat rate ver a long term, even though it knows that conomically that is worse, because it is certain, is clear and it is much easier to do a business eal that way.

Once the financier knows what the rules are, s with us at Multistream, then the only issue is conomics. I do not know the backgrounds of e members of the committee, so I do not know ow many of you are involved in finance, but I nd very often that people outside the financial ommunity are surprised at the rates of return e financial community demands. Typically, onventional debt, bank-type debt or mezzanine ebt, is 14 to 16 per cent rate of return. Venture apital, at the other end of the sort of safe group investments, is 30 to 35 per cent annual rate return.

What is happening with small hydro is that it not safe enough, in the eyes of the financial ommunity, to be conventional debt, so we annot get away with 14 to 16 per cent rates of turn. We can get away with a 20 to 25 per cent te that is sort of in the middle between venture apital and conventional debt.

I think that is a temporary situation. I think hat we have is a private power industry that is not yet mature; it is in its adolescence. People are starting to be involved and it is starting to develop some infrastructure, but it is not there yet by a long way. As long as it is at that stage, the financiers are nervous. They are talking to people who do not have six vice-presidents working for them, do not have marketing plans and fancy glossies and stuff like that, and that makes them very nervous, so they ask for a slightly higher rate of return.

As the industry matures, as people come into the industry and it has a broader base, the fundamentals of small hydro or private power generally, which are much lower in risk, will come forward and the rates of return required will go down substantially, I think to the 14 to 16 per cent rate.

The reason why that is important is that when we had class 34 financing, we could do a lot of projects at today's buyback rates, because although the buyback rates themselves gave us in the mid-teens internal rate of return, the class 34 benefit, by being able to pass it through to the investors, goosed that rate up to the low 20s. That was enough for them. That worked.

Class 34 eventually had to go. There is no question. Everybody in the industry agrees it is not an industry that should survive on that sort of government support. But during the period when people were being drawn into the industry, it was important to have something to get the rate up. That was taken away probably two years too soon–a year or two years, something like that–and as a result, now the industry is faced with a much smaller number of sites that are economic, that is, in the 20 per cent to 25 per cent rate, without the government's incentive.

The government incentive is not going to come back. I do not think anybody expects it. What that means is that the industry now has to look to the fundamental economics of private power to figure out how it can get that rate. The fundamental economics, as everybody in the industry I think agrees, are that the buyback rate is artificially low.

If the buyback rate were at the sort of range that was competitive with the costs of new nuclear, or new anything else for that matter, then I think everybody in the industry would agree that they would still be able to get the appropriate rates of return and still be able to produce quite a substantial amount of independent generation.

The bottom line, I think, is that for this industry it is very important that we know what

the rules are, first of all. For example, when we go to Ontario Hydro and say, "We want to bring this site on line," Hydro should not be able to say to us: "There is going to be a cost for the interconnect. We cannot tell you until you have built the facility." It might be $20,000 and it might be $250,000. That is a barrier and that is it; that project is dead once they say that.

Or we cannot be in a situation where we go to Hydro and say: "Our financiers need to see a contract. Until they see that we have a contract that you are going to buy our power, they are not going to give us any money." That is part of the certainty problem. If Hydro at that time can say, "I am sorry, but we are not going to give you a contract until you are connected to the grid," it is basically saying, "We do not want your power." The first thing is, we need to know what the rules are. They have to be clear and they have to be certain.

Second, once we have that we need to have, for the short term at least, a full-avoided-cost buyback rate. Full avoided cost is probably somewhere between six and eight cents; I do not know. I am sure you are going to go into that in some detail. In that sort of range, there is a lot of generation that can come on stream. After a short period of bringing people into the industry at full avoided cost, I think the industry will be ready to go to a bidding process in which people compete for the right to provide power, and the lowest bid wins.

The result is that, from the point of view of the overall cost of electrical supply it cannot be worse than it already is, because full avoided cost obviously is not worse than what you are avoiding, and ultimately has to be better because bidding has to end up still being lower than avoided cost.

I do not know what else I can say. I think that is where companies like Multistream are. We are cautious because of that situation, but we see a lot of possibilities once the rules are clarified.

Mr. Headford: Just to elaborate on what Jay Shepherd is saying, this is not a risk-free business. We bought Multistream. We worked with the 60-year averages of flow and water levels, and because of the weather this year, our rivers are just about dried up. We are getting virtually no revenue. We did not think that in our first summer these rivers would be so low. I am just pointing out that there is real risk there.

I have been talking about small power for nowhere near as long as Jay, who has been in it since the 1970s, but just in the last year; now I talk to people who say, "What about the greenhouse effect?" So from Bay Street's point of view, if you are talking about a 14 per cent return on your capital, they say: "There is weather and there is that greenhouse effect and there are potential machinery problems. We could put out our money on far safer things and get 11 per cent or 12 per cent. Why should we fool around for an extra possible per cent or so?"

Raising money for the projects right now is not a cakewalk. There is risk in it. There is not a lot of risk in it. It is not a high-risk deal, but it is not a low-risk deal either. There is an element of risk which has to be recognized because Bay Street recognizes it. That is where your money is going to come from.

1440

Mr. Chairman: Thank you. Are there questions from the committee?

Mrs. Grier: You talk about the need for certainty and I can appreciate that. We heard yesterday from the Waterpower Association of Ontario about some of its difficulties working with the Ministry of Natural Resources in obtaining sites. You have not touched on that but seemed to imply that sites were not a problem, that you had alternatives. Could you expand on that a bit?

Mr. Shepherd: Multistream has, so far anyway, chosen to acquire private sites rather than crown sites, partly because acquiring crown sites is a bit of a pain. For a business that wants to be active and move when it needs to, paying more for a private site sometimes makes more sense than waiting a year and a half or two years to get a crown site.

Mrs. Grier: Are there are a large number of private sites as yet undeveloped?

Mr. Shepherd: I would say yes, quite a substantial number. Certainly, we have not had any trouble identifying them, although they can be expensive. The good ones are very expensive.

Mrs. Grier: You talked about the advantage of the short lead times. I am wondering how much of that lead time is perhaps due to a simpler approval process for a private project as opposed to a public project, and specifically due to the fact that private projects are not designated under the Environmental Assessment Act.

Mr. Shepherd: Actually, in private projects the bulk of the lead time is delays caused by dealing with Ontario Hydro or with government. In terms of actually building them, we have sites right now that we could build on and have done by Christmas, but we cannot because

we know that it is going to take us six months to yak with Hydro and it is going to take us another three months to get an interconnect plan done, and then they are going to change it on us–like that.

From Hydro's point of view, frankly, in all the information I have seen on its process, and I was involved in the Ontario Energy Board hearings in the last couple of years, I have not seen that their long planning process is largely regulatory. I think it is largely internal. They spend a lot of time talking about things before they do them. That is understandable. They are a big organization and they have to be careful. They are doing very big projects. When you are doing a $10-million project and you are a small company with 10 employees, there is just not hat much you can talk about before you have to go and do it.

Mrs. Grier: What you are in effect saying is hat while Hydro is telling us that there is not an enormous potential from your sector; in fact, Hydro by its own attitude and way of dealing vith your sector is fulfilling that prophecy.

Mr. Shepherd: No question; that is absoutely true, yes.

Mrs. Grier: One of the other things you nentioned was that there was some potential for vind. That really surprised me because Hydro ias certainly indicated that because this was not California, we did not have the mountains and he ability to have wind, and it was not in any vay a significant potential supply source.

Mr. Shepherd: It is totally economics. If the uyback rate is 4.94 cents, they are absolutely ight; there is no potential for wind. If the uyback rate is $10, of course there is lots of otential for wind. Somewhere in between is an conomic spot, probably in the eight to 10 cents er kilowatt-hour range. I know, for example, hat in very good wind regimes in Alberta, eople are building projects at the five to six ents per kilowatt-hour range and will make ioney at them. In our worst wind regimes, it vould not be unreasonable to think that at eight o 10 cents there would be no problem.

Mrs. Grier: What do you mean by a wind roject? Are you talking about a field of wind or re you talking about small scale to suit a pecific need in a specific area?

Mr. Shepherd: Both are possible, but in erms of generation supply options, no, I am alking about multimegawatt wind farms. With e type of demand requirements that are being iscussed with this committee, the totals are less than the total amount of wind power in California right now. We do not have as good a wind regime as Altamont Pass does, but we still have some nice windy places in Ontario.

Mrs. Grier: Where, or do you not want to tell us?

Mr. Charlton: Bay and Wellesley.

Mr. Shepherd: That is right. For example, there has been talk about the Leslie Street Spit, which is actually quite an excellent site for wind, although you could not put a lot of machines on it. There are lots of others.

Mrs. Sullivan: You talked at one point about employment created through private power generation. I wonder if you could tell us what the continuing impact on employment is, past the construction phase. How many people does it take to run a plant?

Mr. Shepherd: If it is well built, not very many. We have two at Multistream right now. One person spends a portion of his time there and that is all he needs. We can probably do seven or eight in a local geographic area and still have one person look after them. If you have an active building program, you are constantly employing people that way.

On the other question, I am doing a project farther north, in Hearst. One of the questions we have been talking about there is whether there is going to be an impact on nonelectrical generation employment because there is a large power source there. Is there going to be industry drawn there and stuff like that? We do not know yet. It is totally unpredictable.

Mrs. Sullivan: I wonder if you could expand your discussion of the need for certainty in the contract rules and so on. We talked about not knowing, for example, whether you could be connected to the grid until after the site is built.

Mr. Shepherd: To distinguish between whether we know and whether we can convince the financiers that our knowledge is reliable, we can go talk to Hydro. Hydro is very good at dealing with independent generators on that level. You can go talk to them. They know what they are talking about. They are trying really hard. In the last year it has been like night and day. They will sit there and say, "Yes, we will do this and you can work it into the plan," and everybody is very happy.

You can go back to your financier and say, "I talked to Joe Blow at Ontario Hydro and everything's fine." He will say: "Show me something in writing. Show me you've got a contract, a letter of intent, something." When

you go and try to get that, then you start to run into the bureaucracy. It can take months and months. You might not get it at all.

The other part of it, of course, is that on the actual interconnect itself, what sort of technology are you going to need? Because there is not yet a standard, you cannot predict how much it is going to cost you. You have probably heard some horror stories already about that. Most of them are a couple of years old and things have improved since then, but it is still not possible to go to Hydro and say: "Here's my project. Give me a number for how much you are going to charge me to interconnect me to the grid." They just will not give it to you. They will say legitimately, "We don't know yet," but that does not help you in dealing with your finances.

Mrs. Sullivan: Why would they not know?

Mr. Shepherd: Because they are still very early in the game of trying to figure out how to best and most efficiently hook up private generators.

For example, they now have a sort of standard for small synchronous machines–synchronous, I think; I am not that good on the technology. They developed that standard with Galetta last year, working out how to connect up the Douglas generating station. That standard is now six months old. They are not a long way down the technological way yet. As they are still learning, the industry has to pay for it in time and in money.

Mr. Chairman: Mr. Runciman?

Mr. Runciman: I think you have covered it.

Mr. Chairman: All right; Mr. Argue.

1450

Mr. Argue: The committee is reviewing Ontario Hydro's demand/supply planning strategy, and I was wondering if you had had an opportunity to review the four strategy elements dealing with independent generation specifically, and if you had any comments on them. I could briefly touch on them.

"Rates for purchasing power from independent generators and incentives for independent generation projects shall be up to the avoided cost to the system as a whole. Rates and incentives for independent generation may vary-"–depending on a number of factors–"including the reliability, timing and location of the deliveries." For projects of less than five megawatts, there would be standard contracts available. For projects above five megawatts, Hydro would regularly communicate the need for power and a bidding process would be engaged.

I was wondering whether you have any specific recommendations to this committee with regard to Hydro's proposals with regard to these strategy elements on independent generation.

Mr. Headford: I will let Mr. Shepherd answer, but I will just make one point on fully avoided cost versus the current buyback rates.

When I first got involved and class 34 was in place, I had discussions with two major investment dealers who were very seriously talking about putting together $50-million funds, as a beginning. That is pretty good; that puts a lot of power into place.

Since class 34 has gone away and with the current rate, which is nowhere near the fully avoided rate, there is, frankly, not much interest out there. There is some interest, but not enough to get this whole industry going the way the mining industry and the oil and gas industry are going in this country, because they have been incentivized by one structure or another. Those are exploration deals, and with this you are dealing with a very certain source of power.

Certainly, if the incentive were there, this industry has the capacity to just explode. Right now, it is not in that mode. I want to make that point with respect to the concept of fully avoided cost.

As Jay Shepherd said earlier, it is the early part. You can take the fully avoided cost today and you can freeze it for a long period of time in order to get everybody building, in order to get people developing the industry and building turbines so you can get your turbine costs down so that more of these can be put into place.

Because somebody is actually building turbines, you do not have to get every one custom built. There is a whole industry waiting to happen, but the incentive has got to be there. Better that it is there at the front end to get the whole thing rolling than growing the way it is structured right now, tied to the consumer price index and that kind of thing. That is my comment on fully avoided costs.

Mr. Shepherd: On the points you raised, on avoided cost there is no question that the industry has been pushing for full avoided cost, virtually since I have been involved in it. I do not think the problem is whether anybody agrees or disagrees with that. I think everybody agrees with it, industry, Hydro, government and everybody else. Nobody agrees with what it is. It is all very well to say we should pay a fair price.

Γhat is what Hydro is saying. It is a great idea. What is the price?

In terms of varying rates based on reliability, ime of supply, etc., those are all very good deas. There is a certain amount of let's crawl efore we walk and walk before we run here. Let's first get our minds around what the basic ate should be and then start to add those other hings.

I think industry would agree with all of them. f you are more reliable, you should get more noney. If you are less reliable, you should get ess money. If you provide power at the right ime, when it is needed most, you should get aid more for it. Those are very private sector deas. But let's first get the basic rules clear efore we start to add the embellishments.

In terms of standard contracts, I do not know why a contract would not be standard at any ize. I suppose you get up to a certain large size nd you may have to have some special things in ne contract, but certainly if I have a six-negawatt project, I do not want to spend four ears negotiating the contract with Hydro. You ould easily do that. That is only a $12-million roject, or less. There just is not enough time in hat sort of project to play around with negotiating a custom contract. At 100 megawatts, all ght; you get a team of lawyers on it. I am sure ydro would love that; I certainly would. For naller projects, that is too much delay and too uch cost.

On the bidding process, and I think this is the ost critical thing here, Hydro has already, to y knowledge, decided to go ahead with the dding process. This is not an option; they are oing it. They have a team in place setting up e structure for its bidding process. Everybody the industry knows it. Their plan is to have it troduced by February. It is too early for that. you have a bidding process with an immature dustry, an industry that has not yet developed own infrastructure, what will happen is ople will say, "No, I'll go into an industry here I know what the rules are." People are not oing to speculate that they are going to get the w bid.

What I suggest is that you should have a ear, straightforward rate for a couple of years til you have an industry big enough, with ough people with financial clout and experience, to make bidding worth while. Then when u have bidding, you will get lots of bidders ho know what they are talking about and who ll be able to bring projects on at very low ofit margins. That is what you want.

Mr. South: You have indicated that there is a wide range of opinion on what full avoided cost is. What is your opinion of Ontario Hydro's full avoided cost of getting electricity produced today?

Mr. Shepherd: Of course, it is a very complex, technical question and the economists really have a better feel for the intricacies than I do, but I can tell you generally that I think full avoided cost is what it costs Hydro today, in capacity cost and energy cost, to add a marginal kilowatt-hour to its current system. It is essentially the proxy plant method.

Mr. South: What is your estimate of what that cost is today?

Mr. Shepherd: I am only guessing, but I am guessing it is in the eight-cent range. Certainly, their numbers on Darlington suggest that sort of range.

Mr. South: Hydro is willing to pay only 4.7, is it?

Mr. Shepherd: They are willing to pay 4.94, but 4.94 is not what they say full avoided cost is. They say full avoided cost is about 3.7 or 3.9 now, something like that, but they do that by some interesting mathematics.

Mr. South: Creative.

Mr. Shepherd: Yes.

Mr. Chairman: I have one question. Maybe you could answer it. We have heard some suggestions as to the amount of potential independent power that is out there–5,000 or 6,000 megawatts, something like that. You talked about the things blocking it. Say we get them in place at full avoided cost rate with a standard contract and so on, so those blockages are out of the way. It seems to me that 5,000 or 6,000 megawatts could need $6 billion, $7 billion or $8 billion in order to produce the necessary facilities. Is there that much money up there? Are the financiers ready to put that much money into this thing in the next decade, say?

Mr. Shepherd: I am not sure the question is whether the money is out there, because the money is going to be spent one way or the other anyway; either it will be spent by Hydro or it will be spent by the private sector. I think the answer is the investment community would prefer to put it into the private sector than into Ontario Hydro's hands. Yes, the money is out there, easily.

Mr. Chairman: You do not see any limit. Long-term investments often come from the

pension funds. This sort of thing is not needed for life.

Mr. Shepherd: No, it is not yet.

Mr. Chairman: It may change.

1500

Mr. Shepherd: What is going to happen is that you are going to have the gimmicky investments over the next couple of years–funny preference shares, small business development corporations, partnerships, all sorts of nonsense like that. As the investment community gets comfortable with the idea of investing in private power, you are going to start to see a lot more conventional debt and a lot more public company share issues and stuff like that; and that is all legal for life. That is where the money will eventually come from.

Mr. Chairman: So the impediments, in your view, are the buyback rate, the standardized contract, those sorts of things. If those were out of the way, you would not see any trouble raising the money.

Mr. Shepherd: No. I think that is the consensus in the investment community. It is easy.

Mr. Charlton: I will go back to the question on full avoided cost because essentially what you have said to us is what we have heard from everybody and everywhere.

Mr. Shepherd: Everybody except Ontario Hydro agrees.

Mr. Charlton: Hydro agrees that everybody disagrees about what full avoided cost is. Everybody agrees that everybody disagrees. From your perspective as private operators in Ontario, how do we resolve that? What kind of mechanism do we need in place to resolve the question of full avoided cost?

Mr. Shepherd: Actually, in my presentation I had a section on that but I cut it out because I was being long-winded. I think you basically have three choices. One is, you have a technical study of how to calculate full avoided cost. You get everybody to yammer about it until finally everybody is tired and comes to a consensus. That should take a fairly long time but it has the advantage of certainty.

The second possibility is that you have an independent body like the Ontario Energy Board or somebody like that given the power to set the rates each year on that principle of full avoided cost, and then it can be flexible on how it interprets it.

The third way, which I personally–not speak ing for the industry–think is the best way, is tha the government should come up with a number Virtually, you could pick it out of the air, it doe not matter; you know what the range is. Pick number, as Alberta did, put it in place and se what happens. Alberta has done that figuring We know that we can get a number that is a least within range. If it is just high enough, w will get a whole bunch of power generation an we can adjust the number, based on how muc we need. That is what Alberta is doing righ now. It just picked a number right out of the air.

Mr. Chairman: Mr. Headford and Mr Shepherd, I would like to thank you very muc for coming in and talking to us about this an giving us the benefit of your views on what ma or may not be stopping independent power fror coming into play here in Ontario.

Our next witness is Mike Pavey. Mr. Pavey i going to be speaking to us on the subject o purchasing power. You have just been hande Mr. Pavey's paper. Mr. Pavey, you might sta by giving us a brief outline of what you do, the you could take us through the paper. We wi have some questions and discussion after yo have finished your presentation.

MICHAEL PAVEY

Mr. Pavey: I am some little distance from th projector so I will have to sort out the logistic of that as we come to to it.

First of all, Mr. Chairman and members o the committee, let me thank you for th opportunity of speaking to you today. My nam is Michael Pavey. I have been involved i economic and financial analysis and generatio planning for electric utilities since 1973. Prior t 1986, I was vice-president, utility managemen for Monenco Consultants Ltd. Since Augus 1986, I have operated as an independent consul tant, providing services to clients in the electri cal energy sector, either directly or throug Monenco Consultants Ltd. I provide consultin services directly to Maritime Electric Co. Ltd and I am a director of strategic planning for tha company.

I have appeared before the board of commis sioners of public utilities in Newfoundland an the Public Utilities Commission in Princ Edward Island on matters related to allowed rat of return, financing and generation planning. have also appeared on several occasions befor the National Energy Board on matters related t electricity export licences and electricity expor policies in general.

The focus of my remarks today will be interprovincial electricity purchases. I should state at the outset that the views I express here today are my own and do not necessarily reflect the opinions or viewpoints of clients or other organizations with whom I am associated.

I intend to outline briefly the various types of purchase transactions that the electric utility industry currently engages in and provide several examples of these types of purchases. I will also outline some of the benefits and problems associated with electricity purchases.

My comments will be based largely on the experience of Maritime Electric, which has had an extensive power purchase program in place since it first became interconnected with the mainland in 1977. In that context, it is probably useful to review the scope of Maritime Electric's activities.

Maritime Electric Co. Ltd. is a regulated, investor-owned electric utility serving Prince Edward Island. The company is regulated by the Public Utilities Commission of Prince Edward Island which has jurisdiction over, among other things, rates, capital expenditures and the issue of securities.

The company owns and operates a fully integrated power system, providing for the generation, transmission and distribution of electricity throughout the island. The system has about 40,000 residential customers and about 8,000 commercial and general service customers. The total electrical load on the island is about 120 megawatts–somewhat smaller than the Ontario system.

As I indicated earlier, prior to 1977, Prince Edward Island was not connected electrically to the mainland. While the island is rich in farm land, has a strong fishery and boasts many beautiful seascapes and beaches, unfortunately it has not been blessed with indigenous energy resources of any significance. Consequently, Maritime Electric relied on imported oil as its primary energy source in the production of electricity.

The company has two power plants on the island. The plant in Charlottetown has a capacity of about 70 megawatts and burns heavy oil, while the plant in Summerside is a gas-turbine plant with a capacity of about 40 megawatts and is fueled by diesel oil.

In 1977, two 100-megawatt submarine cables were installed across the Northumberland Strait to interconnect the Maritime Electric system with that of New Brunswick Electric Power Commission, the electric utility serving New Brunswick.

Since that time, Maritime Electric has increasingly looked to the mainland as a major source of electrical supply in an effort to reduce power costs on the island. I will take a short pause here and see if I cannot get the projector in operation.

I have prepared the graph, which you see on the screen, which shows the levels of Maritime Electric's net generated and purchased energy over the period from 1976–the year before the interconnection was installed–to 1987.

The graph shows that by 1981, only four years after the cable was installed, over 90 per cent of the island's electrical energy requirements were being met from mainland sources. The graph also shows, beginning in 1981, the energy contribution to island needs made by Maritime Electric's share of the NB Power-Maritime Electric jointly owned generating unit located in Dalhousie, New Brunswick.

Since 1977, Maritime Electric has entered into a broad spectrum of power and energy purchases, ranging all the way from very short-term, hour-to-hour purchases of interruptible energy to the purchase of an ownership share or equity participation in an existing thermal generating unit.

With that little bit of historical background, I would like to outline briefly the different types of electricity purchase agreements that are common in the industry and into which Maritime Electric has entered. Contrary to popular belief, electricity is not a homogeneous product. The potential number of different types of electricity purchases is, as a senior executive of Hydro-Québec recently stated, limited only by the imagination of the selling and purchasing parties.

I would like to digress for a moment and warn you that I had a colleague of mine review this material just recently. He suggested to me that the next section of this material is a little tough going. I thought I might provide a little incentive to get through that. What I had in mind was perhaps a little quiz at the end of this discussion and sending the results to your constituents. Bear with me and I will try to make it as painless as possible. In addition, I think I have another transparency, which I will put up, that hopefully will give some organization to this material.

1510

Electricity purchases are typically classified as either energy purchases or power purchases.

An energy purchase would normally involve an agreement to purchase or buy a specified amount of electricity–that is, kilowatt-hours–over a specified period of time; for example, 100 gigawatt-hours or 100 million kilowatt-hours of electricity between the period April 1 to October 31, 1988. It would not, however, include any specific right to capacity or to kilowatts. While the purchaser would be reasonably assured of receiving the contracted energy within the time period specified, he would have, depending on the terms of the purchase, only limited control over the rate at which the energy was delivered at various times over the period of the purchase contract.

On the other hand, a power purchase agreement would typically involve an agreement to buy capacity–that is, kilowatts–or the ability to generate electricity at up to a specified capacity factor, which would then determine the maximum amount of energy that would be available through the power purchase agreement. For example, a 50-megawatt purchase at an 80 per cent capacity factor between November 1, 1989, and October 31, 1990, would provide a maximum of about 350 gigawatt-hours of energy. The mathematics of that are pretty straightforward. All we are talking about basically is, 50 megawatt-hours over a period of 8,760 hours in the year times the capacity factor will generate that 350 gigawatt-hours. It is really as simple as that.

The key difference between an energy purchase and a power purchase is that a power purchase provides the buyer with much greater control over the rate at which the energy will be delivered and the timing of those deliveries. This ability to schedule or dispatch electricity makes power a higher-quality and generally a more costly product to purchase than straight energy.

Energy is also classified on the basis of the likelihood that it will actually be delivered. Interruptible energy means just that: that the delivery of the energy may be interrupted by the seller under certain specified conditions. Firm energy is more reliable and typically carries with it much higher degrees of delivery than interruptible energy. For example, an agreement for the purchase of 100 gigawatt-hours of firm energy with a five per cent interruption provision means that the purchaser would get 100 gigawatt-hours of energy in the normal course of events and in no event, short of force majeure, would he get less than the 95 gigawatt-hours of firm energy. Again, firm energy is a higher-quality product than interruptible energy and, consequently, is more expensive to purchase.

If you wished to establish a hierarchy of interprovincial electricity products, the top-quality product would be power, followed by firm energy and then interruptible energy; generally, the higher the quality, the higher the price.

There are several other factors which impact on the price of electricity purchases in addition to the relative quality of the product. These are the source of supply of the product and the duration or term of the sale agreement. If, for example, the purchased electricity is supplied from an oil-or coal-fired generating unit, the purchase price will almost certainly contain escalation clauses to cover changes in the cost of the primary fuel. On the other hand, electricity supplied from hydraulic sources may have a more stable and predictable pricing basis.

The term or duration of a sale will often impact on price, with longer-term transactions generally being more expensive than short-term transactions. In any extraprovincial electricity sale, the seller's primary pricing objectives will be, first, to cover the costs of the export sale and, second, to maximize export revenues. A utility selling electricity on a short-term basis will typically supply it out of short-term surpluses on its system. As the seller's in-province load grows, the power will be recalled from the purchaser to service it.

Consequently, in this situation the seller, in pricing the sale, will seek to at least cover the short-run incremental costs of production; that is, the fuel and incremental maintenance costs. To the extent that market conditions permit, the seller will also seek to obtain some contribution towards the fixed costs–that is, the interest and depreciation expense–associated with a capital investment in existing generating plant that is servicing the sale. However, since no new generating capacity is required, and the existing capacity used for the sale will be available in the future as required to meet the seller's in-province load, the sale price may not include the full cost of the capacity.

On the other hand, as the term of the electricity sale is extended, the selling utility is more likely to have to install additional generating capacity at some point to service the sale as its short-term surpluses are absorbed by the growth of its own in-province load. In this situation, in order to satisfy the cost recovery pricing objective, the full incremental cost of

that new capacity will be reflected in the sale price of the electricity.

In summary, then, electricity purchases can be classified as power, firm energy or interruptible energy purchases and are priced on the basis of the quality of the product as well as other factors such as the source of supply and the term of the purchase agreement.

I suspect at this point that it may be useful to look at a few real-world examples of some of the different types of interprovincial electricity purchase transactions.

Starting at the interruptible end of the purchase spectrum, Maritime Electric regularly purchases large quantities of interruptible energy called economy energy. Economy energy purchase transactions can be made on as short as an hour-to-hour basis and are entirely at will; that is, there is no obligation on the part of the seller to sell, nor is there any obligation on the part of the potential buyer to buy. The sales are interruptible at the seller's discretion, often on no more than 10 minutes' notice. Consequently, an important precondition to this type of sale is that the purchaser must be capable of producing the energy itself in the event of interruption.

The purchaser's objective in entering into economy energy purchases is to minimize short-run energy production costs. The pricing basis in transactions between thermal-based systems is typically the average of the seller's incremental cost of production, the bulk of which is fuel costs, and the purchaser's incremental avoided cost, the so-called split-increment pricing formula. The seller's profit in these transactions is one half of the difference between the seller's and buyer's incremental cost of production. The purchaser's savings is the other half of the difference in costs. In the case of an economy energy sale from a hydro-based system, where the incremental cost of hydraulic production is essentially zero, the pricing basis is usually 80 per cent of the purchaser's avoided cost. In situations where demand for economy energy exceeds supply, the split-increment pricing formula will be only the floor price, with the energy ultimately going to the highest bidder.

Recently, Maritime Electric has been paying about 3.1 cents per kilowatt-hour for economy energy priced under the split-increment formula. At the same time, the company is paying about 2.7 cents per kilowatt-hour for economy energy that otherwise would be destined for the US market but has been intercepted by Maritime under the terms of the National Energy Board Act. In both cases, these prices are subject to significant variability with changes in oil prices, as oil typically is the reference fuel on both sides of the transaction.

Moving to an example that is of a somewhat less interruptible product, in 1985 Maritime Electric entered into an agreement for interruptible energy on a six-year term basis with NB Power. This energy was also destined for the US market and was made available to Maritime Electric by NB Power under the terms of its export licences granted by the National Energy Board. The terms and conditions, including price, under which this energy is made available to Maritime are the same as those that were offered to Central Maine Power Co. in New England. These include a take-or-pay requirement and a 10 per cent benefit test.

Under the take-or-pay constraint, Maritime Electric has agreed to pay for the energy associated with 20 megawatts of capacity, labelled the reference quantity, at a monthly capacity factor of 85 per cent, whether it is taken or not. If the company is unable to take this quantity of energy in any given month, the energy paid for but not taken may be taken in any of the next six months, provided the take-or-pay quantity for these months has been taken and the reference quantity is not exceeded. The energy is priced on the split-increment basis using NB Power and Central Maine Power costs as the reference costs. While the price again fluctuates with oil prices, there is a floor price set at 110 per cent of NB Power's incremental production cost and a ceiling price set at 90 per cent of Maritime's avoided cost, which gives some protection to both the buyer and the seller. In addition, delivery of the energy can only be interrupted in the event of limited and specified difficulties on the NB Power system. Recent prices for this energy have been about 3.2 cents per kilowatt-hour.

1520

A contract that Maritime Electric recently entered into is a good example of a short-term firm purchase. The agreement with NB Power has a term of six years, from November 1, 1988, to October 31, 1994, and involves purchases of varying quantities of capacity and firm energy.

Under the agreement, Maritime Electric may elect to take varying quantities of capacity and/or firm energy up to the contract maximums in each year. The quantities of capacity and firm energy offered and taken are independent of

each other; that is, Maritime Electric may take as much capacity as it wishes and no energy or, conversely, as much energy as it wishes and no capacity, or any mix in between. The firm energy is available not less than 95 per cent of the time and not less than 75 per cent of the energy will be available during peak hours. Peak hours in that contract are defined as eight o'clock in the morning until 10 o'clock at night, Monday through Saturday, inclusive. The price of the capacity is constant at $84 per kilowatt per year over the term of the contract. The price of the firm energy is fixed and independent of oil prices. It starts at 3.9 cents per kilowatt-hour in 1988 and rises to 5.9 cents per kilowatt-hour in 1993.

A recent firm power contract between Hydro-Québec as the seller and Central Maine Power Co. as the buyer provides a good example of a long-term firm purchase agreement. The agreement extends from 1992 to the year 2020–that is some 28 years–and involves staged capacity purchases that start at 100 megawatts and increase in steps to a potential maximum of 900 megawatts over the term of the agreement. The energy associated with this capacity is available at an average capacity factor over the term of the agreement of 75 per cent on a take-or-pay basis. The scheduling of energy is, with some limitations, largely controlled by Central Maine.

The price of the power is made up of two components, with a price for capacity and a price for energy. In both cases, the prices are based on complex indexation formulae applied to reference costs expressed in 1985 US dollars. In simplified terms, the capacity charge is based on a fixed charge rate applied to a 1985 capital cost per kilowatt. This cost is indexed on the basis of an American utility plant cost index to the first year in which a block of capacity is taken, after which no further indexation of the capacity charge occurs. Adjustments to the fixed charge rate based on changes in long-term interest rates do occur periodically over the term of the contract.

The contract also provides for floor and ceiling prices based on average electricity rates at the retail level–and I underline retail level–in Quebec and New England, respectively, that again give some price protection to both buyer and seller.

With the scope and complexity of the price indexation formulae, it is difficult to give specific price information. However, if we make some assumptions with respect to exchange rate–say, 80 US cents per Canadian dollar–and a fixed charge rate of 16 per cen which was the base rate in that contract, then th price of electricity under this contract, at 198 price levels–and I underline that–would be i the order of 5.8 cents to six cents per kilowat hour.

This contract tends to confirm the fact th long-term power purchases, even if based o hydro sources, are likely to be expensiv relative to present-day costs.

Finally, I would like to discuss anothe long-term form of power purchase, joint owne ship. Joint ownership of a generating unit b two or more utilities has been a fairly commo practice in the United States for a number c years. Maritime Electric entered into the fir joint ownership agreement in Canada with N Power in 1981, when it purchased an undivide 10 per cent equity interest in NB Power' number two dual-fuel generating unit–wher they will fire both coal and oil–located i Dalhousie, New Brunswick.

The unit had been in service since 1979. Th 1981 sale price was based on the unit's recon struction cost new, less accumulated deprecia tion. A 10 per cent premium was added to thi cost in recognition of the avoidance by Maritim Electric of construction and performance risk by buying into an existing unit.

In the ongoing operation of its share of th unit, Maritime Electric pays NB Power a operator's fee as manager of the plant, as well a its proportionate share of direct fuel and opera tion and maintenance expenses at cost. Mari time Electric schedules its energy take an receives power from the unit, subject to avail ability or operational readiness of the unit. Th joint ownership agreement effectively transfer to Maritime Electric its proportionate share c all of the benefits and all of the risks normall associated with ownership of the unit over it economic life.

Interprovincial electricity purchases can com in an almost infinite number of shapes, sizes an types and can, depending on particular circum stances, offer a number of significant benefits t the purchasing utility. Through purchases, utility may gain access to a broader range c primary energy sources than those indigenous t its own service territory. Those primary energ sources may have the potential of reducing c stabilizing costs and reducing the environment impact of electricity production, not only in th purchaser's service territory but in Canada as whole.

In the short term, interutility electricity purhases can help to reduce fuel and purchased nergy costs and provide capacity or energy to ridge short-term supply deficiencies arising rom load forecast variances or delays in the ommissioning of new plant. Purchases may rovide access to economies of scale not vailable to the purchaser if it were restricted to nit sizes appropriate to its own system. They an also be staged in increments of capacity that nore closely match annual load growth, thus voiding the rate shock that often occurs when arge base load generating units are added to the ystem and the associated fixed costs are ncorporated into the rate structure. Purchases re also generally a much less capital-intensive ption than direct ownership and can provide n opportunity to conserve scarce capital reources.

However, the inclusion of interprovincial lectricity purchase options in the generation lanning exercise does not come without its roblems. By definition, the addition of a umber of purchase alternatives to the generaon planning process will add significantly to e complexity of the process. This is particurly so for supply options such as purchases, here the definition of the option may require o-ordination with and, in fact, be contingent on e selling utility firming up its own generation xpansion plans.

Purchasing rather than building may also sult in the temporary or permanent loss of the conomic spinoffs normally associated with ower plant construction and operation. Disnces between the generation source and load entre may give rise to concerns about security supply. With the exception of equity or int-ownership transactions, purchases will not ovide the purchaser with the full economic enefits that are normally associated with lifene ownership of a generating plant. Even a ng-term purchase of, say, 25 years' duration is latively short in comparison with the ecoomic life of major hydroelectric installations, hich can range from 60 to 100 years.

Finally, for a variety of reasons, including anadian geography and significant institutional d, indeed, constitutional barriers, a purchasg utility generally is restricted in its purchase tions to dealing directly only with adjacent ilities. For example, it would be virtually npossible in today's environment for Ontario ydro to purchase power directly from Newundland and Labrador and have it wheeled through Quebec for delivery to its Ontario markets.

Despite the potential problems, the range of different products and the flexibility in sizing and timing inherent in interprovincial electricity purchases can, in many situations, provide the generation planner with the opportunity to achieve significant cost savings and other benefits that otherwise would simply not be available to the system. Ontario Hydro, flanked by two of the lowest-cost electricity producers in the world, Manitoba Hydro and Hydro-Québec, both of whom are very active in the export market, is well placed to exploit these opportunities as they occur. Thank you.

Mr. Chairman: Thank you, Mr. Pavey. Are there questions from the committee?

Mr. South: In regard to the statement, "For example, it would be virtually impossible in today's environment for Ontario Hydro to purchase power directly from Newfoundland and Labrador," you are thinking of going overland. What about a marine cable? You are talking about 1,000 miles from Labrador to Ontario. If you ran it down the St. Lawrence River, you seem to remove most of those problems you have on land, but is there a very high energy loss per mile of submarine cable?

1530

Mr. Pavey: I think the type of transmission that you would be talking about would be direct current transmission. In fact, Maritime Electric right now is in the process of conducting a joint study with Hydro-Québec to examine the possibility of shipping power from the Gaspé Peninsula to the Iles-de-la-Madeleine and onward to Prince Edward Island. The distances that you are talking about there are about 225 kilometres from the Gaspé to the Iles-de-la-Madeleine and about 100 kilometres from Iles-de-la-Madeleine to PEI. I think the distances you are talking about with an undersea route from Labrador are well in excess of that. I am not sure what the logistics or constitutional impact of an underwater cable would be, but I do not expect the economics of it would be very promising.

There are provisions right now, under the National Energy Board Act, section 90.1, by which the Governor in Council can in fact allow a transmission line to be built, say, by Newfoundland and Labrador Hydro through Quebec to access other markets. I suspect they would probably prefer to access the United States market than Ontario, again simply from the revenue maximization point of view, but they have not exercised that option, because I think

they were concerned about the practicality of it. It is a long way to bring the power. You would want multiple transmission lines in order to ensure some level of reliability of delivery, and to the extent that you cannot co-ordinate and incorporate that with the existing transmission systems, I suspect the economics of it are prohibitive.

Mr. South: In distance, you are looking at from Labrador to Ontario, as you say, about 1,000 miles, and you are talking about submarine cables that are approaching–oh, you are talking in kilometres.

Mr. Pavey: In kilometres, and distance is much shorter than that. At the same time, we have Nova Scotia, for example, talking about an undersea cable to serve Boston Edison. The distances there are quite large. I have gotten only bits and pieces of the information on that, but my understanding is that they feel it is technically feasible to do that.

Mr. South: Do you know what that distance would be?

Mr. Pavey: Not off the top of my head. I think we are probably talking in the range of 300 or 400 miles. I am not aware of any kind of undersea transmission cables of anything like the kind of distances we are talking about.

Mr. South: France supplies England, and I assume it is a submarine cable.

Mr. Pavey: That is right, and there are a number of DC cables up in the Scandinavian countries, but again the distances are much shorter.

Mr. South: But is it the actual energy loss per mile of transmission line that is the limiting factor?

Mr. Pavey: It certainly would be for an alternating-current system; you are very limited in the distances you can ship on an AC system. With a DC transmission system you can indeed transport electrical energy much longer distances, but there is no doubt that losses will be a factor. The matter of concerns about reliability, simply because of the distances between the generation source and the load centre, would bear on that as well. That is really why in that kind of situation you would like to be able to integrate at least with part of the Hydro-Québec system to have a multiple delivery system and improve the reliability of the system.

Mr. South: You are looking at transmission lines down from James Bay to its market, which must be well over 1,000 miles, would it not?

Mr. Pavey: The distances are significant; that is right.

Mr. South: I would think that your energy losses in those overland transmission lines really are higher than submarine cables.

Mr. Pavey: Those are direct current lines coming down. In fact, the new line they are talking about constructing for the NEPOOL contract is a multiterminal direct current line. It is moving towards the cutting edge of the technology; there just are not that many of those kinds of systems around now. By multiterminal I simply mean that power is taken off at points along the length of a line as opposed to just putting it into one end and bringing it out at the other.

Mrs. Grier: I was with you for most of the way up to page 13, and I am looking at your description of the contract between Hydro-Québec and the Central Maine Power Co. As you say, it is a complex indexation formula. I am wondering what other factors would go into those kinds of indexes. You have given one example here. Are there other considerations that could be used?

Mr. Pavey: I lost a section of it with respect to the energy pricing. The energy component of this is priced on the basis of the gross national product deflator in the United States. It is indexed really on a GNP-type deflator.

As for the other factors in this contract, for example, I sensed–because I was not party to the negotiations but was just looking at the contract itself–they appeared to pick up the benefits that Central Maine Power would gain by having Hydro-Québec, a strong financial credit, finance the project; and in that sense they picked up the difference between a triple-A and a BAA credit rating in determining interest costs.

Another characteristic of this contract was that it had provision for Central Maine Power to provide transmission access for Hydro-Québec to points south of Central Maine. That has been a characteristic in Hydro-Québec's contracts recently, where they are seeking to increasingly gain access to points south in order to sell their power, and they are building into these contracts provisions for wheeling or provisions for the creation of a third corporate entity; this would be a joint ownership between Central Maine and Hydro-Québec perhaps, in this case, to put together a transmission corridor that points south. Certainly, when a purchasing party can bring that kind of benefit to the table, then that

vill impact on the kinds of prices you can egotiate.

There are other factors. For example, when lew Brunswick Electric Power Commission vas seeking to market portions of its point in the epreau generating unit–it is a 630-megawatt enerating unit and quite large in the system–ne of the concerns that they had was that it was eally too big for their system and they wanted lay off some of the financial risk associated vith that unit and with the performance of it. As ng as their sale contracts covered the base cost f the transaction itself, the next primary bjective was to make the sale and lay off some f this financial risk, as opposed to just straight evenue maximization. So, in different circum-ances, there can be other factors that can come ito play in the negotiation process.

Mrs. Grier: Okay. There are two aspects of our answer that I find interesting; one was that hen I have asked Hydro whether it would be ossible for them, because of the difficulties connections between Hydro-Québec and On-rio, to wheel the power through the US into ntario, that did not seem to be an option. Yet u are saying that Hydro may be requiring laine, for example, to provide the capability of heeling power through Maine to some other irchaser. Is that what you are saying?

540

Mr. Pavey: That is right, but it would be ore to points south. Again, Hydro-Québec, d it has been quite forthright about this, is king the view that it is a revenue-maximizer ith its export sales. That is not to say it is not epared to sell to Canadian utilities, but it does ant to get full market value. It does have cess to Ontario now. To try to get at it via the S rather than directly strengthen the intercon-ctions would create a number of difficulties–st the agony of export licences and so on in dition to arranging wheeling in the US, which n be more difficult than simply to get it back to an Ontario market, which tends to be a less crative market for Quebec than, say, the US oically would be.

Mrs. Grier: I am sort of groping for echanisms by which Hydro-Québec might ek to protect itself. One of the things I think have been told is that there is some certainty in its forecasts of its own needs over e next 20 or 25 years. How does it protect elf in these contracts against finding that in t it needs some of that excess power itself?

Mr. Pavey: Once it gets into a long-term ntract, it is in, basically. Certainly, because it is a hydro-based system, it does have some protection with respect to hydraulic conditions and the quantities in the Central Maine contract can be reduced in dry water years. I think it has that kind of protection. But in terms of the absolute capacity itself, it is under a contractual obligation. To that extent, if it has underforecast and it does have supply deficiencies, it is going to have to build additional generating capacity.

It is in that sense that in any of these long-term transactions, you are invariably going to be looking at the seller's best estimate as to what it thinks the long-run incremental costs of entering into that transaction are going to be. It will do that through a variety of ways: running its system without the sale to determine what the incremental costs are and then loading the sale on to see what additional costs are, and looking at the capital cost of additional capacity brought on in the year 2000 as opposed to the embedded cost of capacity now. All of those things are front and centre in its mind, particularly after the kinds of difficulties you can see Churchill Falls (Labrador) Corp. getting into with its long-term power sale with virtually no escala-tion provisions in it.

Mr. Argue: I have one question, concerning the promotion of more transactions between Canada's provinces. I know Maritime Electric and the government of Prince Edward Island have been advocates of more regional sales of electricity over the last number of years. I wonder if you have any comments on ways in which government could promote more inter-dependence between Canada's utilities.

Mr. Pavey: It is a very difficult problem. Electricity tends to be seen as a provincial matter as opposed to a national matter. As a result, you are dealing with vested provincial interests in terms of being able to have what I call free market access across Canada–i.e., east and west–as opposed to free market access north and south, which is what the most recent electricity policy announced by the Minister of Energy, Mines and Resources about two or three weeks ago gave us.

You are quite right. We have been actively pushing and promoting to develop a concept of free market access, east and west. By that, we mean the opportunity for a potential purchaser to have access to multiple sellers, whereas I think in the more recent round of electricity deregulation for export sales, the exporters were arguing that free market access meant freer access to multiple purchasers. We think there needs to be some balance between the two.

How you would achieve that is a very difficult question. One possibility might be the notion of an electrical equivalent to TransCanada PipeLines Ltd.; in other words, an electrical common carrier which would provide a means by which electricity could travel east and west across the country without impinging on intraprovincial transmission capabilities, which is an area where the provincial utilities have expressed a great deal of concern.

Another approach might be to provide some financial incentives to provincial utilities to strengthen their interprovincial electricity ties, on the provision that those financial incentives were granted with their giving some greater access to their own in-province transmission facilities for the wheeling of electricity across the countryside.

Another alternative, I guess, would be some kind of imposed solution by an organization like the National Energy Board, which would simply set a fee for wheeling. I am not very optimistic about that latter alternative, simply given the realities of Canada, the Canadian Constitution and where the powers and responsibilities for electricity presently lie.

I am hopeful that the recent initiative that has been announced by the minister to have the National Energy Board look into this issue will at least allow a reasonable examination of the issues to establish what are bona fide concerns, and what perhaps may be what I would classify as straw men put up by vested provincial interests.

Mr. Chairman: Are there any further questions?

Mr. Charlton: Yes, I have just a couple of very brief questions. Back at the beginning of your presentation, you showed us the table on Maritime Electric's net produced and purchased energy; table 30 shows the turnaround. In 1976 your system was totally supplied by your own generation on the island. I presume most of that was coming from the Charlottetown plant.

Mr. Pavey: That is right.

Mr. Charlton: There was a very significant and rapid decline in the use of that plant to the point where, I guess in 1984 and 1985, it was not in use at all?

Mr. Pavey: Virtually not in use at all. The quantities were so small that they simply do not show up.

Mr. Charlton: In 1986 and 1987 we see a growth in its use again.

Mr. Pavey: That is right.

Mr. Charlton: Can you describe for us, ju briefly, a projection into the future? Are y going to have to continue to increase the use that plant?

Mr. Pavey: No, I do not anticipate that will. As I indicated, we entered into agreement just recently with NB Power for t provision of firm capacity and firm energy reasonable prices. They are not bargai basement prices by any stretch of the imagin tion, but they should give us a fair amount energy over the next five or six years.

The reason that you are seeing the beginnin of generation on the island again is indicative what is happening to the electrical system Canada in general and particularly in easte Canada. That has been a drying up of t surpluses of electricity that came into place the early 1980s when new generation capaci had come on stream, when the economies h slowed down and load growth simply was n materializing at the level that had been antic pated.

In that environment there were large quant ties of surplus energy available which organiz tions like Maritime Electric took advantage because the pricing was attractive. More rece tly, the levels of surplus energy have decline At the same time, the price of oil has declin significantly from what it was, say, in 1985 that at this point in time Maritime Electric fin that in fact it can generate on the island with at prices that are below prices of ener available directly from NB Power and below t prices of energy that is being exported to t United States.

It is a combination of those two factors th see it coming back on.

1550

Mr. Charlton: That leads to the next ve brief question then. You are saying it is n going to continue to be brought back on in larg amounts. Is that primarily because of t uncertainty of the future of oil prices, or to wh extent are there environmental concerns in th as well?

Mr. Pavey: There is no doubt that there a environmental concerns with the plant, as the are with any thermal generating plant, and w are addressing those. The intention certainly not to shut down the plant, but rather to addre those environmental concerns so that we ca comply with emission standards.

As I say, it really has more to do with the vailability of this firm energy, which will duce the uncertainty for us of whether or not e have the supply of interruptible energy. The iergy that we buy against the Charlottetown ant is the kind of energy which literally can be terrupted on as short as 10 minutes' notice and e availability of it is determined very much by ater conditions in Quebec, it is determined by ternative markets in the United States, and the rpluses have been shrinking. It is in that sense at we have moved to protect ourselves against e risk of shortages of supply.

Mr. McGuigan: Just to summarize your esentation and perhaps to help me in my inking–I realize the pitfalls there are in neralities–I think what I hear you saying is at generally it is not as advantageous to buy om another province. Is that what I am aring?

Mr. Pavey: No. The basic message is that ere is a whole range of products out there hich can be used to solve a whole range of oblems, very short-range problems or longnge problems.

I would say that certainly our feeling is that a licy which had a utility depending entirely on rchases, and even long-range purchases, is obably not appropriate because you are giving what I call the long-term economic benefits sociated with ownership.

In that sense, Maritime Electric, in terms of ying to obtain long-term sources of supply, efers to negotiate the equity-participation, nt-ownership route rather than, say, a 20- or -year deal which is going to simply not be ere for you 25 years down the road and leave u in a situation where you then have to place that capacity at then-current capacity st.

Mr. McGuigan: It was the long term I was nking of. I recognize the benefits of purchas- surplus power.

Mr. Pavey: I would generally agree with that tement, given of course that you still need to ok at the economics of it; and if somebody is ing to give you a really good deal on a ng-term power purchase, that may compen- e for the economic benefits forgone in years through 80.

Mr. Chairman: Mr. Pavey, I would like to ank you for coming in and speaking to us lay and providing us the benefit of your ight on interprovincial purchases and helping us to understand that. It appears to be a rather complex issue.

Mr. Pavey: Thank you.

Mr. Chairman: Our next witness is Bob Paehlke. You might come forward, Mr. Paehlke. For the benefit of the committee, Mr. Paehlke is going to be speaking to us on some of the labour impacts of various energy strategies and options. Did you have a paper, Mr. Paehlke?

Dr. Paehlke: I must apologize. I do not have anything in writing to give to you, but I will try to keep it clear.

Mr. Chairman: All right. Of course, Hansard is making a transcript of what goes on, so we will end up with that. Perhaps you could start by just explaining to us a little bit about who you are, then take us through your presentation and we will have questions afterwards.

BOB PAEHLKE

Dr. Paehlke: I should say that I teach political studies and environmental studies at Trent University. I have studied especially environmental policy and, to some extent, energy policy and their effects on labour for the last 18 or 20 years. I do not put myself forward as an expert on Ontario Hydro in particular, but I have had some experience going back as far as the Porter commission and that kind of thing.

The other comment I would make before starting is that I will comment for perhaps half my time on impacts on labour but I want to draw some broader conclusions, essentially of an environmentalist, if you will, regarding the demand-supply planning study.

There are essentially six points I would make. I will make them and then go back through and make some comments about three of them, as time permits. I will watch the time carefully.

The first and broadest conclusion I came to on reading that document, which was given to me about a month ago, was that I would hope the Legislature would condition approval of new capacity, particularly coal or nuclear capacity, upon the attainment of some international standard of electrical energy end-use efficiency.

That is extremely important and it is my sense that it is the way the government, from what I read, is inclined to. The kind of international standard that would make sense to me, for what it is worth–and I am sure there are a wide variety of other possibilities–is something on the order of 90 per cent of the use-by-use electrical energy efficiency attained in other

countries that are reasonably good at an electrical energy end-use efficiency–it might be Japan, Scandinavia, West Germany or the west European average–or any kind of figure like that which would peg our achievement of energy efficiency in industrial sectors or in residential sectors or commercial sectors to their general standard. That is the first goal. Once that is obtained, then it makes sense to think about new capacity.

The second point is that I immediately recognize there is one problem with this; that is, that you have lead-time problems with putting in capacity. One might have to base the decision on a trajectory of improvement in energy end-use efficiency towards that standard, such that the lead time was taken into account. That is, if it looked as though 10 years down the road that standard would be obtained, then earlier on, eight years previously, some commitment could be made about new capacity if that new capacity were thought necessary. I think all of this is quite a different approach than has been taken in the past.

The third point, very briefly, and I will not elaborate on this, is that I am supportive of the efforts Ontario Hydro has made with regard to thinking about load management and the efforts others have made and the suggestions others have made with regard to independent producers being brought into the process of electrical energy production.

The fourth point has to do with the establishment of some kind of arm's-length review mechanism advisory to the Ministry of Energy regarding long-term capacity decisions. Points have been made about that before. I will just mention now that I have written a paper called Government Regulating Itself: A Canadian-American Comparison, with regard to environmental and other regulation by government of government-owned industries. I will leave that with the clerk and I will not elaborate on that point much further. It is a work in progress. It might be of interest to some of you.

1600

The fifth point regards nuclear power in general, which one cannot not comment about with regard to a document like that. I would say that I am, probably contrary to most people certainly in Europe or in general, less anti-nuclear than I was 10 years ago. Among environmentalists, I would probably be seen as a moderate on the question of nuclear power, but I would still see both coal and nuclear as last-resort options, as I think is clear from the earlier comments I made.

Finally, with regard to the point I am invited to talk about and that I will talk about at some length, which is regarding the effect on labour, generally studies have found–and I am not particularly pleased with the quality of the various studies I have seen–that the labour impact, that is, the employment-level impact of conservation, energy efficiency improvements, renewable sources of energy and small-scale energy generation, are at least as positive as any kind of demand-driven approach. There are quite a few factors which are often not taken into account in these kinds of considerations and I will touch on some of those. That is by way of summary of what I am going to talk about.

In the remainder of the 20 minutes of your time that I will spend, I will look at the first three of those points, largely with regard to demand management and capacity creation all at once. I will skip over the fourth point, the one with regard to which I will leave a paper, and then comment on the effects on labour, which is I think what you are most interested in hearing and if there is any time left, I will comment a little bit on nuclear power, but I suspect I will not get to it.

So with regard to demand and supply in general, having followed Ontario Hydro, Hydro affairs and Hydro documents on and off for 15 years now, my impression is that Hydro has indeed with this document shifted its emphasis and I do not doubt for a minute that it has learned what to say in ways that make environmentalists and those who are environmentally concerned more comfortable with its approach.

I kept wondering, as I read, to what extent has this change been taken to heart within this large corporation since its lingering distrust from past days and whatever. I found one or two points, possibly three, I will mention, where I am a bit concerned that they do not go as far as I would hope they would go or even as far as they would appear to go in terms of statement.

Let me just make the two points briefly. I think in the end their estimate of the potential for conservation is very cautious. Maybe that is correct. One would want to be cautious. You would not want to overestimate how much conservation was possible. On the other hand one can produce a self-fulfilling prophecy: if one assumes that a certain amount is the maximum possible, that indeed will become the maximum possible.

Statements by the minister strike me as very :asonable in terms of the possibility of 20 per ent efficiency improvements overall in the rovince over a roughly 15-year period. I would so note that the reasons the Hydro document tes–this is page 11-16–that conservation otential is limited, seem to me to be an vitation for creative legislative remedies, not cessarily a set of conditions which determine e situation.

The second comment about the shift in nphasis in this document from earlier Hydro ocuments–what I will do is read a sentence om the document and then comment on it. I ink it is an important sentence. They say, here tend to be negative economic impacts as ectricity prices are increased above production sts to discourage electricity use."

There is quite a variety of variations on that itement made in the document. It seems to me at there is nothing necessarily magical about oduction costs as they affect the price of wer, even though that has been the tradition at ydro. It seems to me that, in the end, whether arging more for electricity will have negative onomic effects depends on quite a long riety of factors. Here I get towards impacts on our.

It depends on the relative cost of other energy urces. It depends very much on the unit cost electricity in other jurisdictions with which r industries are competing, and as well on our ative level of energy efficiency compared to se competing jurisdictions on an industry-by-lustry basis.

t also depends on how additional costs for ctricity are introduced, in the pattern in ich they are introduced, in the speed with ich they are introduced and in the advanced rning with which they are introduced.

That is to say, if we were to charge more than ming cost of production, if we were to ose to do that in order to achieve consider- e efficiency, we would not necessarily rease the cost to industry if industry knew or 10 years in advance that this was going to e place. That is to say, efficiency improve- ats could occur prior to the time that the rges were put in place.

nyway, what I am saying is that you cannot e that kind of statement to be a magic nula, that is, automatically somehow, if tricity prices were ever, for anyone–not just general, but for any user–to rise above the of production in order to discourage tricity use, that somehow there would be "negative economic impacts" and we would find ourselves in a pickle in some way or another. I think it is a much more complex question than that.

Let me just add one other point on that, and this really turns us towards the labour issue. One of the ways in which one could actually get positive effects from having high charges for electricity and for energy in general, not just for electricity, would be if those jurisdictions which have high electricity charges were forced to become highly efficient with regard to processes, equipment, appliances, buildings and so forth. Not only would they then be more competitive should everyone's energy prices rise, as seems as certain as anything in this world with regard to the future, but also getting ahead of the game can be highly advantageous to industries such as appliance producers, producers of industrial equipment.

1610

One can almost argue that one of the ways in which Japan has achieved success is not because it has different habits of industriousness or different organization of the workplace; it is also because it had higher energy costs sooner and its products were designed at that level of higher energy costs. When the rest of the world's energy costs caught up with Japan, indeed their products were more desirable. This was eight or 10 years ago when, all of a sudden, Japanese cars were obviously more desirable, not just because of durability but also because of energy demand and because many of their electrical products are low energy users, etc. One can overstate that, but I think it is an important consideration.

I do not mean to be solely critical of this document. There were some very good sections. Section 9.8 listed some proposals with regard to energy conservation that I thought were excellent.

Let me now turn for five or 10 minutes, and then I will conclude, to some specific comments on labour impacts that occurred to me as I read through that report. I will start by quoting from page 8-3 of the document.

First, "Like some of the supply options, demand management can have a relatively high Ontario content." By "the supply options" they mean particularly nuclear, which they take to be the best. Then in terms of Ontario labour content: "The labour for installation of efficiency improvements will be within the province and widely distributed." A little bit later, they say, "In addition, wind generation could

replace some of the energy produced from costly diesel-fuelled generation in remote northern communities, which are not connected to Ontario's transmission system."

I think statements like that are very much a real advance on earlier Hydro thinking, especially in the 1970s and early 1980s. However, they are understated in several important ways. What I am doing here is comparing the effect on creating employment of a dominantly demand management kind of strategy in contrast to a demand-driven, supply-producing kind of strategy.

Efficiency improvements are not only, as they say, widely distributed. By their nature they are almost perfectly distributed in the pattern where people live and work in the province. I think that is extremely important, and the point they do not make, what is unsaid, is that the supply-option-favoured nuclear power does not supply geographically distributed employment; it provides geographically concentrated employment for the most part.

I think that is an important distinction between the two. Even if one allows that the amount of employment is equivalent, as they seem to suggest, it is not in the same places. Also, I think in general there would be a moderate advantage to locations like northern Ontario, especially if one added into the emphasis on energy efficiency some use of small-scale renewable supply. Obviously, it is economic off the grid, but it is probably fairly close to economic in the north and in the remote regions even if the grid is available. That is a complex question.

I would also say that not only wind energy but other sources of renewable energy could provide employment in areas where employment is desperately needed rather than, on the contrary, in places where, if anything, there is a labour shortage.

Earlier, I think I made reasonably well the point regarding anticipating a long-term future of relatively high energy prices. Obviously, that will not occur smoothly, evenly and predictably in a pattern that can be anticipated by any soothsayer or economist, but I think one can anticipate that over the long term, energy prices will rise as rapidly in the future as they have in the recent past, the past 15 years.

That being the case, it is important to try to get our economy not only competitive in energy terms relative to other economies but also to learn to anticipate in terms of the kinds of products it produces and the kinds of processes it uses and also could sell elsewhere to anticipate a long-term rise in energy prices. In t management of our provincially owned utili that strategy should have some place in thinki about demand and supply in the long term.

Also with regard to labour, it should be sa that demand management, energy efficien improvements and so forth often involve labo which is less skilled, less often organized th do large-scale energy supply projects; and t labour which is less skilled and less organized in many ways more in need of employment a less often spoken for articulately by organiz labour. I think that distinction should also noted.

I have two last short points. By so reckonings and some studies I have read–an have not emphasized this because I am completely satisfied with the variety of studie have seen and there are too many maybes most of them–energy conservation, ener efficiency improvements and the production energy from small-scale renewable sources said to be something on the order of two to thr times more labour-intensive than large-sca energy supply projects like nuclear power.

My suggestion in the end is that a detail current study would be useful. There may m well have been one commissioned in t process by an independent agency; if there h not been, there should be. The assumption conclusion implicit in there is that the levels employment generated are roughly comparab within Ontario between nuclear power a energy efficiency improvements. It would su prise me if that were the case.

The final point is about one other sentence there I noted that, "Demand options have t shortest amount of time elapsing between wh money is spent and when benefits show up That is a statement from the demand-supp document. I think that is Ontario Hydro learni something it had not thought a lot about 15 yea ago, and I think that is a very importa observation.

1620

You tend to get less borrowing witho payback when you get into large-scale projec I am sure you have heard that many tim before; it is fairly obvious. That tends to dri up interest rates and that in turn–and this is n taken into account very much–is very negati for employment levels and labour generall The higher interest rates are highly problemati and I think the scale of borrowing which Hyd has done and which new nuclear capacity wou

volve would in itself have a negative effect on erest rates and thereby on employment levels.

I will stop there and not make comments out why I am not quite as antinuclear as I used be. I will let that rest.

Mrs. Sullivan: I wonder if you could further pand on your comment that demand manage- nt programs would require or involve people the labour force with fewer skills and who are s organized.

Dr. Paehlke: It is a sweeping generalization.

Mrs. Sullivan: That is why I was asking you be clearer.

Dr. Paehlke: Quite clearly, those involved in construction of a nuclear power plant are all ganized and virtually all highly skilled.

The reason I am uncomfortable with the dies is that it depends what you mean by nand management and energy efficiency provements. If it is appliance efficiency ndards you are talking about, you are typi- ly talking about a unionized labour force that highly skilled. But if it is decentralized provements in commercial facilities, in rewir- of office buildings, the kind of small-scale ng I think about is, for example, that I cannot into my office without lighting a bank of 10 12 fluorescent lights, whereas I need only of them. Someone has to rewire that room that you can put on one, two or three itches.

There is an endless, long list of that kind of provement on a decentralized basis that uld involve, generally speaking, in smaller ations anyway, nonunionized labour of more dest skills than those who are running a crane construct a nuclear power plant. I use that as example. I do not want spend too long, but h the right incentives in terms of price, those ngs would occur in many, many locations und the province. It would also involve sulating commercial buildings and so on.

Mrs. Sullivan: We were quite impressed, for mple, with the presentation of the R-2000 up. They talked about how much training to be involved in the introduction and very of that particular program. It seems to there was not only a skills upgrading olved before it could be achievable, but it also very much built in as part of the gram and indeed accounts for some of the y in the achievement of the program.

Maybe I am quarrelling with your choice of words "less and less skilled and organized," it seems to me that the labour component is certainly going to require skills for demand management programs that we have yet to teach, in fact.

Dr. Paehlke: That is a good point. That is all I can say. The comparison I was making, I suppose, is between the quite technical and very high-paid kinds of construction jobs and the somewhat less technical, often not-as-high-paid kinds of construction, repair, maintenance or renovating jobs, as a pattern, but I would also agree that some of those lower-level jobs will involve new skills.

Mrs. Sullivan: I was surprised that you did not put more emphasis on the impacts of changing to electrotechnologies as a result of deficiencies and the effect that would have on labour. Do you have any comments on that or have you looked at that?

Dr. Paehlke: Give me an example.

Mrs. Sullivan: For example, making a plant more efficient through the use of electronic equipment or electrotechnologies frequently can mean labour displacement.

Dr. Paehlke: I think that is the case. From an environmentalist point of view–and I do not pretend to be a spokesman for labour–if in doing that you are reducing total energy demand, you are probably making a gain in terms of environmental impact, so there you really are trading employment opportunities for environmental improvements. I have said that I do not think those trades occur as often as we sometimes think they do, but I think that might well be an example where it does occur. It might also be, in many cases, economically necessary as well as environmentally beneficial.

Mr. McGuigan: I also share some of Mrs. Sullivan's concerns about your statement about the relative quality of the labour for the two types of jobs. I am certainly not an expert on what happens at a site where they are putting up a nuclear plant, but looking at the type of people who are required for renovations and that sort of thing, where they are largely working on their own, they cannot be supervised as well as they could be at a central plant.

I am looking too at when we had the federal insulation program going. There was a lot of good work done during that time, but there was a lot of bad work done too and it is showing up in attics of buildings where there is moisture: the rafters are rotting, the joists are rotting and so on. I tend to think that a certain amount of good results from going to the decentralized.

I agree with all the points you have made, except that I have some reservations on the quality of labour. Maybe we are talking around the point of quality and skill and maybe we have an apples-and-oranges comparison, but I would like to make the point that it requires very skilled people, especially to do renovations properly and to achieve the results we are looking for.

Dr. Paehlke: I did not by any means mean to denigrate the capabilities of the people who might be doing the kinds of things that are involved in demand management. I think my generalization was even broader than it might appear and is not necessarily appropriate just to electricity efficiency improvements.

Taken broadly, environmentalist-urged employment would include things like recycling, which is highly labour-intensive and quite low-skill level. It is not that it is not an important skill and not that it cannot be done better or not so well, but I think it is just one additional consideration in thinking of these two strategies.

You will tend to get a lot more organized defence of the jobs associated with nuclear power plant construction. Quite clearly, labour, management, Hydro and others would be very bothered by there being an interim period between the completion of Darlington and the beginning of the next nuclear power plant. I think that is implicit here.

Presumably, the people working there might well find other kinds of high-skilled, high-paying construction work outside that industry, but the people who might gain jobs, who do not now have them in many cases, would be people who do not have that skill level, who are undoubtedly quite capable but not capable of running a crane or doing welding or that kind of thing.

Mr. McGuigan: I can accept that.

Mr. Runciman: I am sorry I missed the early part of your discussion, but are you an economist?

Dr. Paehlke: No, I am a political scientist.

Mr. Runciman: I was specifically interested in a number of areas that you made reference to, and they were interest rates and employment possibilities with respect to the Hydro debt, but I guess you have not been involved in any in-depth analysis of that. That is just an observation.

Dr. Paehlke: Yes.

Mr. Chairman: Are there further questions at all? We have a couple of more minutes, Dr. Paehlke, and you intrigued me with your doub[...] negative that you are not so antinuclear as yo[...] were before. I wonder if you might explain th[...] to us a little bit. Does that mean you are neutra[...] You might just take a couple of minutes [...] expand on that for the benefit of the committee[...]

Dr. Paehlke: I have spent a lot of tim[...] thinking about nuclear power over a number [...] years. I think that six or eight years ago I wou[...] have taken the position most environmentalis[...] take, which would be that not only do we n[...] want more but gradually, over time, we want [...] phase them out. Lately, I have come to the vie[...] that this is probably not a good idea. [...] magically I were in charge and the dictator [...] Ontario, I would not do that; most environmen[...]talists would. Some of the obvious reasons hav[...] to do with CO_2 and the greenhouse effect an[...] acid rain.

I did not bring the booklet, the document, b[...] in Energy and Canadians into the 21st Centur[...] a study that has just been done by the feder[...] government, there is a dissent by David Brook[...] someone with whom I have worked qui[...] closely over the years. It suggests that it is n[...] necessarily the best thing to do to phase o[...] nuclear power, because, if anything, we mig[...] have to reduce fossil fuel combustion in th[...] foreseeable future. To do that and to be phasin[...] out nuclear power would be highly problemati[...] That is from someone, David Brooks, who ha[...] spent most of his life responding to his ow[...] concern about nuclear power. I trust his judg[...]ment and mine are very similar ones.

I am also troubled by the fact that oil price[...] have fallen in recent years and it looks as if the[...] will stay low for some time. That suggests to m[...] we are going to have to make a transition fro[...] oil faster than I thought we would have to hav[...] made it; that is to say, we are not going to g[...] the gradual transition from oil, a per cent or tw[...] a year over a 40- or 50-year period. If we are n[...] phasing it down now, we are going to have [...] get that some time later and faster. I would hop[...] that we would have every option available at th[...] point when we had to do that.

It is that kind of consideration, and mayb[...] one other I would mention, and that is that [...] think electricity can be a part of considerab[...] general improvement in the efficiency of energ[...] use. It is not necessarily nuclear-generate[...] electricity, but electricity as opposed to oth[...] items. That was in response to Barbara Sullivan[...] question that was lying at the back of my mind[...]

Automation, reduction of the need to trav[...] back and forth to work on a daily basis, work [...]

ome, substitution of electronic communica-ons for travel and goods production, all that ind of thing can in the future involve less total nergy while still doing most of the things most eople want to do, just doing them better with ss energy in the form of electricity.

I am surprised Ontario Hydro does not sell at harder. There have been several academic rticles on that subject in the journal Energy olicy, talking about long-term shifts in energy se. One possibility that is held out is an energy uture which is highly electrified but in which otal energy use is actually significantly redu-ed, at least on a per capita basis.

If that possibility is real, and I do not know if is or not–it seems plausible–it makes one onder. If one could trade six fossil-fuel plants r coal-fired plants or six usings of coal, etc., to ake steel for a small amount of nuclear power, might be worth the trade in the long run. At ast, I would not want to foreclose that ossibility.

That is the shift in my thinking about nuclear power. I still think that as an electrical system, Ontario is highly dependent, and maybe too highly dependent, on nuclear power as one energy source. None the less, on a national basis or even a global basis, nuclear power is not an option I think we can afford to exclude.

Mr. Chairman: Are there any further questions? Dr. Paehlke, I would like to thank you very much for coming in and talking to us a bit about your perspectives on the labour impacts and some of the other environmental issues.

Dr. Paehlke: I appreciate that too.

Mr. Chairman: For the benefit of the committee, just before we adjourn today, we have Dr. Connor-Lajambe's paper. She will be presenting it to us on Monday. It has just been handed out, if anybody would like to review it in advance. I will adjourn the committee to Darlington.

The committee adjourned at 4:36 p.m.

CONTENTS

Wednesday, September 28, 1988

SELECT COMMITTEE ON ENERGY

Chairman: Carrothers, Douglas A. (Oakville South L)
Vice-Chairman: McGuigan, James F. (Essex-Kent L)
Brown, Michael A. (Algoma-Manitoulin L)
Charlton, Brian A. (Hamilton Mountain NDP)
Cureatz, Sam L. (Durham East PC)
Grier, Ruth A. (Etobicoke-Lakeshore NDP)
Matrundola, Gino (Willowdale L)
Ray, Michael C. (Windsor-Walkerville L)
Runciman, Robert W. (Leeds-Grenville PC)
South, Larry (Frontenac-Addington L)
Sullivan, Barbara (Halton Centre L)

Substitutions:
Lupusella, Tony (Dovercourt L) for Mr Matrundola
Stoner, Norah (Durham West L) for Mr. McGuigan

Clerk: Manikel, Tannis

Staff:
Argue, David, Consultant; with Passmore Associates International
Richmond, J. M., Research Officer, Legislative Research Service
Yeager, Lewis, Research Officer, Legislative Research Service

Witnesses:

From DRI Energy:
Osten, Jim

From Multistream Power Corp.:
Headford, Stephen, President
Shepherd, Jay, Director

Individual Presentations:
Pavey, Michael A., Consultant and Director of Strategic Planning, Maritime Electric Co. Ltd.
Paehlke, Dr. Bob, Professor, Political Studies Department, Environmental and Resource Studi
Program, Trent University

Ontario

No. N-23

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy
Electricity Demand and Supply

First Session, 34th Parliament
Monday, October 3, 1988

Speaker: Honourable Hugh A. Edighoffer
Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the bac together with a list of the members of the committee and other members and witnesses takin part.

Reference to a cumulative index of previous issues can be obtained by calling th Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Service Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toronto M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

SELECT COMMITTEE ON ENERGY

Monday, October 3, 1988

The committee met at 2:11 p.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY (continued)

Mr. Chairman: Our first witness this after-
ıoon is Dr. Hélène Connor-Lajambe, who has
›repared a paper for us on societal costs of capital
:oncentration in electric utilities. Please come
'orward. We have about an hour. If you can take
ıs through your paper for the first portion, then
ve will have some time for discussion after that.

HÉLÈNE CONNOR-LAJAMBE

Dr. Connor-Lajambe: Assuming that you
ıave somehow read a little of the paper you
eceived last week, since time is short, I would
ike to go a little further with you and maybe have
look to the future.

In starting, it may be useful to recall that at the
eginning of the utility business, at the beginning
f electricity itself, electricity producers were
ranted a monopoly. That was called a natural
ıonopoly because of the nature of the business.
was necessary at the time to have standardiza-
on. The cost of infrastructure was extremely
igh to assume, and people also wanted to make
ıre rural areas were electricified. In view of all
ıese constraints, the utilities were granted a
ıonopoly and, to go along with it, several
rivileges. Some of these were translated into
rovincial backup when the utilities were going
n financial markets. They were able to come up
ith a lower rate of return and, in most cases,
ıey paid very little rent on waterways, nominal
nounts, most of the time.

It was justified at this time to grant them some
ivileges so they could carry out the production,
e generation, the transmission and the distribu-
on of electricity to all people for the general
enefit. However, this has allowed them, at the
me time, to build an enormous amount of
ɔwer. They have now become huge public
ıtities, in the case of Canada, since most of our
ilities, except two or three, are crown corpora-
ɔns, which implies that there are some further
ıties that are not necessarily assumed by private
ilities.

They have become extremely powerful. They
ve accumulated extremely large assets and in
e process, in some cases, they may have lost track of their own right to existence and abused their power, the power over the users and the power they have over the environment.

I would like to show some of the transparencies I have here. You have also the tables 1, 2 and 3. I have gathered the statistics I could find on the respective amounts of investment in energy and in electricity, compared to total investment. This is a graph about Canada, starting in about 1965 for electricity and a bit later for energy. You see that electricity represents a large amount of our investment in this country in general.

With the help of table 2, you have the numbers for Ontario. This one needs a little explanation because the graph is not accurate. The line that you see is 100 per cent, and the line that reaches to it would say that 100 per cent of the energy investment would have been made by electric utilities in the respective provinces.

The three columns represent Ontario, because they were the only numbers I could get as far as total energy investment was concerned. These numbers represent the proportion of energy investment which are made by electric utilities in Quebec and Ontario.

Try to forget about the top line because it is cumulative. My software has made it as a cumulative cost, whereas it should have started from the bottom. The line at the top represents Canada as a whole. If you compare it mentally to the line which is Quebec, you can see that Quebec is very much higher than Canada is as the proportion of electricity investment compares to overall energy investment.

Ontario is slightly less electrically inclined than Quebec but still very much so. These represent very high amounts of money, as you know, and this is translated into the debts of those respective utilities.

These privileges have allowed these utilities to invest over and above what was needed for public needs and public consumption. The costs of overinvestment are now translating into very high economic and social costs for the respective provinces and Canada as a whole, as we will see now.

There has been some evaluation of these costs, whether they be the lower rate of return or the provincial backup, translating in lower interest rates that the utilities can afford to have on the

market. Some of these costs have been studied. Some of you may have read the Glen Jenkins, Jean-Thomas Bernard, Anthony Scott, and David Burgess reports. These are available studies.

I would like to expand on other costs which are larger and are borne by society as a whole. Some of these costs are quantifiable. They are therefore internalizable. There is a strong pressure now coming from the public to internalize those costs. However, some of them are not quantifiable readily and therefore will not be internalized and translated into higher prices. Nevertheless, they are paid by society as a whole. They will remain a burlden.

In my paper, I have tried to explain what these costs are and what is explainable by the way Ontario Hydro is going about estimating demand and supply. I have said earlier that electric utilities are justified only by the need that people have for their services. They are a business.

However, in the papers I have seen about Ontario Hydro, I could not get a clear perception that the utility knew exactly what its market was, what the demand was and what it was exactly that it meant by end use. They talk about end use in a very general way. If you want to really know your market, know your own business or go to the roots of what your business is, you have to know a little bit better where the demand is.

One of the first distinctions to be made is between electricity-specific needs and thermal electric needs. That is the primary difference to make, because in one case the market is captive and in the other one it is not. If you want to know exactly how stable–what your exact amount of demand is–you have to know the specifics. To know your market exactly, you have to assess exactly what the needs are. The utilities ought to know exactly what every electricity-using device really needs and what the evolution will be over the time horizon considered. If it is 20 years, it is 20 years. If it is more, it becomes more uncertain.

1420

If they go to the root of the need and have the device-by-device analysis, they will never end up with such a big fork in demand forecasts. That will be largely diminished. It is what we call bottom-up analysis. You start at the root of the demand. Once this is properly assessed, the demand will be more certain. They will know with more stability what the future is for their own business.

The second point is about methodology. It is certain that nowadays we cannot afford to look at the future and just project the past. It is certain that one way of looking at the future is b reversing the methodologies that we have seen i the paper and try to assess what is not likely to b more desirable for the future of the people of th province. It becomes more of a normativ exercise rather than purely productive an projective. This way also, the incertitude in th load growth will be largely diminished. Ther will be more certitude in their going abou forecasting the future.

Therefore, what will be needed is not so man scenarios for supply as they have shown. Mor needed will be scenarios about demand, becaus that really is what is going to answer the need c the people. There may be things that would b more interesting than what we see as the resul of 17 or 24 scenarios in supply. We could have social welfare function built into these deman scenarios which, instead of what we have, migl lead us to diminishing demand eventually, wit all purely renewable energy and always depend ing on the social need expressed in the publi welfare function.

Another point is that stability seems to be or of the things that concerns the utilities, an rightly so. However, I am not very impressed b the fact that most of the reasoning and th scenarios seem to turn around nuclear energy and it is not a matter of emotion. Nuclear energ is known to be one of the most uncertain source of energy in the future. In this country we do n even know if we will have any nuclear energy i the next 10 years, according to reports. If by an chance this technology were to collapse, it seem that most of the Ontario Hydro forecasts woul also collapse because it counts on nuclear energ costing so much and it is not so sure that we ca count on that.

Incertitude is almost an inherent part of th nuclear technology. I would have been mo satisfied by seeing a different type of referenc scenario centring on something else that might b less prone to questioning.

Third, assuming that Ontario Hydro is just fied in investing more and borrowing more c financial markets, whether at home or abroad, seems with the amounts of money involved nov it may certainly affect the province of Ontari and by repercussion Canada as well, because th amounts are extremely important and define markets are already quite solicited by oth investment.

If you want to look at graph 3, I will tell yc exactly what I mean. I hope you have had chance to look at it before, because it is likel convoluted and complex in that it tries to asse

the progression of economic development in several countries from 1970 until 1986 or 1987 with reference to 1980 or 1981, depending on cases. In this figure 3–it is not 4; I am sorry, the paper says 4, but it is 3–we see the evolution of the balance of trade of end products as a percentage of gross domestic product, combined with the level of energy trade deficit also as a percentage of gross national product. The main industrialized countries are represented: Federal Republic of Germany, Japan, Italy, Great Britain, France and Canada, as well as, for reference, Ontario and Quebec.

Most curves, as you can see, are gathered in the northeast quarter, indicating a positive balance of trade in manufactured products and an energy deficit. The positions of Canada, Ontario and Quebec differ widely from these. Since 1971 they have maintained a persistent deficit in trade of manufactured products and a strong regression in the case of Canada as a whole. Energy-wise, Ontario has almost gained its financial autonomy and Canada has slightly increased its own. Quebec, which made the biggest investment in electricity, has managed to regain approximately the same energy financial dependency it had in 1971.

I think this graph is extremely important. If there were only one thing I could bring to you, it is all the questions which are in this graph. What do we learn from this comparison? First, exploitation of energy resources is more likely to drain than to fill the coffers of a nation. Ontario may be the only region which improved both its energy financial autonomy and its manufacturing position between 1971 and 1986, but both balances remain negative. Supply energy policies do not replace industrial policies.

The best corner to be in on this graph would be the southeast corner. As you can see, no country has made it yet. Some are getting very close, but it would be very interesting to discuss with you why some have progressed and some regressed. I am only going to do that in the case of Ontario.

Most countries which have regained a similar level of energy autonomy have done so at the expense of their manufacturing sector. One of the most spectacular is the United Kingdom which may have discovered new resources but is paying a very high price for developing them.

Why has this happened, that we are still in the worst part of the graph somehow, that we have not been able to jump into the economically developed countries which have a positive balance of trade in end products, this being taken as a sign of economic development? I submit to you, first, that we have no real watchdog about these policies and our richness in resources has put us on a lazy trend.

We have, after the first oil crisis, developed what we thought was an energy policy; in fact, it was maybe just half an energy policy, looking only at the supply side and forgetting the other side of the equation, the demand side. But also, and maybe something that is worse, is that we have taken energy policy for an industrial policy and have therefore not developed an industrial policy; probably we are still doing it, which I think is worse.

In view of this, I have drafted a few recommendations and suggestions, which you will find on page 15.

1. That we should have demand scenarios attuned to public needs and expectations, developed using bottom-up, end-use analysis, so we know exactly what the utility is supposed to be doing;

2. That the least-cost sources of energy, taking social costs and other externalities and risks into account, be selected first, rather than have all these scenarios.

1430

3. That there be an independent body of experts, able to hold public hearings, that should have legislated authority to pass, modify or reject the plans prepared by the utility.

4. That demand-side options and externalities' representatives, who are users, unionists, environmentalists, farmers and native people, form a fair proportion of the board of administration of the utility to ensure that all possible policies are studied and that external costs are taken into account at the beginning and at the top, thus saving time, energy and aggravation. More and more, public pressure will be pushing for this type of input at the very early stage of energy planning.

5. That a study of what should constitute an energy policy for sustainable economic development be commissioned.

These are very general recommendations and go very much in the–what would be able to solve some of the problems we have here.

In concluding, we could look a little bit at the future to stress the need for this type of recommendation and implementation. We can be absolutely sure that the cost of energy will not be going down. On the contrary, all the costs we have either internally or externally will be going up for some very simple and obvious reasons.

The first one is that the law of diminishing returns is catching up with the utilities as well as

with other resources. The cheap sources of energy are gone, with the exception, of course, of energy efficiency and conservation. On the supply side, the cheap sources have gone first and the quality of supply is therefore going down, meaning it will cost more to get the same energy unit.

Second, the reproductive capacity of the environment is steadily going down. We see concerns about replenishing capital by offering a good interest rate. We replenish our human resources by giving proper salaries and so on. But we do not have yet a mechanism by which we ensure that the environmental capacity is being ensured over the long term. Environment, we now see, is extremely affected, and mainly by energy exploitation and energy development. Damage is steadily going up with the accompanying costs, either immediate or future costs. The greenhouse effect, acid rain, all these are starting to be extremely worrisome for economists.

Third, the costs of pollution control will themselves be going up because of the fact that we are using more sources which are less amenable to being controlled, in the case of coal, for instance, and oil and sulphur. More and more, it will be required to have all the pollution equipment when possible.

Finally, what may cost even more may be the increasing lack of confidence the public has now in utilities which have displayed misplaced priorities and have not always displayed good concern about their uses, which require a different type of service. Also, there is lack of confidence in science itself and in scientists, which is now more and more deeply rooted.

That is why we need research and development that would go more deeply into the social aspect of energy exploitation and study the link between energy, environment and economics, a recommendation which is also in the energy options report.

Second, we will have to rethink the whole of public utilities, certainly in view of the changes that have occurred since the early beginning of the century. Their mandate has evolved, even though their privileges have stayed the same. To do that, we need new institutions which will be able to involve nongovernmental organizations and the public.

Thank you very much. I will go to questioning.

Mr. Chairman: Thank you. Are there questions from the committee?

Mrs. Grier: I will admit my confusion to some degree about the figure on the board, but I notice that in your text you made the point that Ontario was one of the few jurisdictions that gained. I am trying to find the exact wording. "Ontario may be the only region which improved both its energy financial autonomy and its manufacturing position between 1971 and 1986, but both balances remain negative."

Dr. Connor-Lajambe: Yes.

Mrs. Grier: I suspect there are those who would say that if we did improve, it was because we had cheap energy, which is not what you are saying.

Dr. Connor-Lajambe: What I am saying is that the performance has been fairly stable on the manufacturing side of things. If you see the points in 1971 and in 1986, they are not very far apart. Actually, I had quite an amount of difficulty getting some numbers for Ontario. So they have not really progressed on the economic development front in that period. They have just barely caught up with where they were in 1971. You have diminished the energy dependency in Ontario, however, at tremendous cost, since you see that in 1980 there was a regression, which you have regained. You have just caught up with the economic development now and you have made tremendous progress on the energy side.

But what I am trying to stress is that in fact, having all these abilities–you are the most developed Canadian province by far, I would say–for both balances, you are still in the negative nevertheless. You could have done a lot better.

Mrs. Grier: Okay. So what was done differently in the economies that made such progress in that period? What was the determining factor?

Dr. Connor-Lajambe: My assumption, and I may be wrong, is that they had their energy policy linked up and subsumed inside an industrial policy. They were not looking towards developing energy supply as a locomotive for economic development. To me, that is a fundamental difference. They had a real industrial policy. Look at Japan; look at Germany, even Italy. They made progress in that period, even though none of them have real energy resources inside their borders. They had an industrial policy. That would bring their strength up.

Mrs. Sullivan: At one point in your presentation you are critical of Ontario Hydro for not understanding, or being unable to define, con-

umer satisfaction, customer satisfaction. I am orry I cannot find that right now.

Dr. Connor-Lajambe: Maybe it is at the very eginning.

Mrs. Sullivan: I wonder what your view of ustomer satisfaction is and why you feel Hydro as failed in its analysis.

Dr. Connor-Lajambe: Consumer satisfac-on goes beyond rates. It is a valid pursuit to ave low rates, certainly, but it is not all the onsumer is looking at, because lower rates can nly diminish your energy invoice or at least eep it as level as possible. What consumers ould have expected–I do not know how much)ntario has failed, really; I cannot assume–from ur utilities is that they would have reduced our verall dependence on energy, and there were etter means of doing it than by increasing upply.

440

I think Ontario has a very good study on the upply curve of conservation measures which hows that some conservation measures cost less han one cent per kilowatt-hour. There is still a vide array of resources in improving energy fficiency that is below the cost Ontario Hydro as for new resources, new supply. What onsumers should be getting from their utilities is he least cost for their energy needs. The best way f doing it now, and probably for a long time to ome, is by reducing the overall energy need in hysical terms as well, which would translate ito a long-term reduction of their energy ivoice.

Mrs. Sullivan: You did not have the sense om the strategy paper that indeed that was a hanged priority for Hydro?

Dr. Connor-Lajambe: There are words and here are facts and I think people would be very leased to see the facts. This supply curve of nergy conservation was extremely eloquent. It aid a lot just by looking at it.

Mrs. Sullivan: I want to move also to a ifferent topic. Once again, you are quite pecific about the effect of Hydro's debt, not nly on the province's borrowing power but on ther, perhaps private sector borrowers. I won-er if you would expand on that. Have you done udies that actually have shown that Hydro's ebt does impinge on the borrowing power of ther institutions?

Dr. Connor-Lajambe: Ontario Hydro proba-y has one of the best borrowing powers in anada. I am not disputing that. But the fact that has such a beautiful credit rating–I think it is top in the country–means it can come on any financial market and have priority right away. For other people from Canada coming on the same market, that can be quite an obstacle.

Mrs. Sullivan: Do you have evidence that other institutions or other borrowers have been displaced because of Hydro's involvement in the bond market?

Dr. Connor-Lajambe: I do not. I admit I do not, but I do not think anybody can prove the contrary either. I have spoken to several brokers in other cases and it is extremely difficult to assess whether somebody has been displaced. It is a market where everything goes by feeling. It is extremely intangible. However, if you are yourself an investor, you know you will lend only where the risks are least, and the risks are least with the big corporations. The risks are almost nonexistent when it is a crown corpora-tion. I think the credit rating translates into the confidence of the investors in Ontario Hydro to the exclusion of other people who might want to borrow on the same market, because there is just a certain amount of capital to go around.

Mr. Runciman: On page 11, talking about the cost of borrowing increasing, you make refer-ence to the proportion of nuclear generation planning to decrease and that lenders, notably in US markets, refrain from investing in utilities. A lot of the testimony we have heard is that other than the United States and Canada, in a number of other jurisdictions throughout the world, there are significant investments in nuclear energy. Japan is one of the major economic powers making significant investments and other major economies seem to be opting for the nuclear option for a variety of reasons, not the least of which is the environment. I am just wondering how that jibes with what you are saying here.

Dr. Connor-Lajambe: First of all, this is something where I have a reference 11. That is from this parliamentary report of the committee headed by Barbara Sparrow, which cannot be accused of being antinuclear.

Second, for the explanation, I can say that Japan has developed nuclear to quite an extent. They have no resources. However, they have also done tremendously on the other options. I would really mention their development of, for instance, photovoltaic capacity. They will cer-tainly, if things go on, be the leaders in photovoltaic cells in the very near future. They have an organized and very well-thought-out strategy, and nuclear is a minor part in it.

The other country you could have mentioned is France, which used to have plans to develop six

nuclear plants per year. They are now down to half of one per year. The only recourse of the nuclear industry in France at the moment–this is what I got last summer when I was there visiting the Cattenom plant–is that they want to turn military. The civil part of the nuclear industry is looking down.

Mr. Runciman: That may or may not be. Some of the testimony we have heard is that because of the concern about the greenhouse effect and acid rain, etc., there is a much closer look being taken at nuclear energy now.

Dr. Connor-Lajambe: Oh, certainly. However, nuclear energy will never solve any of those environmental problems which come from excess emphasis put on supply through other sources. The best way to look at it would be by diminishing the need for new supply, and nuclear energy will not help that.

Mr. Runciman: I know you have mentioned the diversification and emphasis on demand management, and you have made reference in here somewhere to adopting the methods of some of the US utilities. I am wondering if you have done this kind of economic analysis of the impact in respect to, say, California, which we have had considerable reference to in the hearings, and what has happened in California in terms of the manufactured-goods/energy-deficit kind of graph, so that we could have a really thorough comparison of a comparable jurisdiction.

Dr. Connor-Lajambe: It would be interesting, certainly. I did not make it. I could not do it for the 50 states; maybe the main industrial countries.

Mr. Runciman: I am just wondering how helpful this kind of an assessment is when we are looking at rather significantly large jurisdictions like France and Japan versus an economy like Ontario's. I am just wondering if it would have been more useful for our purposes to take a look at a California, which is probably the one that has been most often referred to in our hearings.

Dr. Connor-Lajambe: It could be done. It is only a matter of getting the numbers and I will be willing to do it.

Mr. Runciman: There are a couple of other things. You have mentioned that the size of Hydro's debt could essentially hamper provincial borrowing, even if it does not affect its credit rating. I am a little curious about that. You are suggesting that with the availability of funds, regardless of, say, a triple A rating, there still may be some problem in terms of accessibility to capital markets because of Hydro, and that this will still not have an impact on credit rating. Tha is what you are suggesting, or that is what inferred from it.

Dr. Connor-Lajambe: That it would nc affect Ontario's credit rating–

Mr. Runciman: Yes.

Dr. Connor-Lajambe: –or Ontario Hydro' own credit rating?

Mrs. Sullivan: It is largely the same thing.

Mr. Runciman: Well, you know.

Dr. Connor-Lajambe: Yes, maybe; I do nc know. Is Ontario Hydro borrowing in its ow name now, or is it still the province?

Mrs. Sullivan: It is guaranteed by th province.

Dr. Connor-Lajambe: So it would be th same. However, the funds would not be goin into the same place.

Mr. Runciman: I was just having som difficulty with the idea that you are saying the may some difficulty raising funds, that th province would have some problems.

1450

Dr. Connor-Lajambe: That is only in th case of the upper load costs. I think the worr could arise because the upper load cost i certainly very high.

Mr. Runciman: I guess my problem is someone with a triple A credit rating is havin difficulty borrowing, virtually everyone i society is going to have trouble borrowing.

Dr. Connor-Lajambe: It can change. It ma not remain triple A in that case.

Mr. Runciman: That is what I am saying There is sort of a contradiction. You are saying "could eventually hamper provincial borrowin power, even if it doesn't affect its own cred rating."

Dr. Connor-Lajambe: I could have said could hamper the provincial developments some where else because the funds going to Ontari Hydro would not be going to hospitals c schools.

Mr. Runciman: When you mention–and th graphs indicate–that you suggest that we hav sacrificed our manufacturing ability and in som regions incurred deindustrialization, do you hav any specifics? Is that an academic theory or ar there any specifics that you could point to i respect to areas of the country where that ha occurred?

Dr. Connor-Lajambe: It is the same idea c crowding out. It is difficult to presume tha

enders will be willing to lend to Ontario uniquely, so they want to diversify their portfolios.

Mr. Runciman: I guess I am having trouble with that sort of a statement, that some regions have incurred deindustrialization just to try to retain the same degree of energy autonomy. I was hoping you might be able to point to something specific.

Dr. Connor-Lajambe: I would refer you to the paper that probably was distributed to you on Hydro-Québec. I do not know if it was distributed. I refer to it at the end, on page 19, note 15. It is a paper that may not have been distributed to you, but it has been distributed.

Mr. Runciman: I wanted to ask a bit about the Hydro debt situation, if you have taken a look at it and what your view is in terms of some of the other things they are doing. We have talked about depreciation of nuclear plants over 40 years. I do not know the impact of these things, but heavy water depreciation, as well, enters into it. I am just wondering if you have taken a look at their debt situation and some of the methods that they are using and if you have any views.

Dr. Connor-Lajambe: I have not looked at it in detail. It was not really my mandate. However, I could not escape making a small comparison with Hydro-Québec. It seemed that some of Ontario Hydro's ratios are not as favourable as the ones from Hydro-Québec.

Mr. Runciman: Debt-to-equity ratio?

Dr. Connor-Lajambe: Yes. Nevertheless, I will tell you Hydro has a better credit rating, so it goes to show that financial markets have different perceptions sometimes.

Mr. Charlton: I would just briefly like to talk to you about the first of your recommendations, which was that demand scenarios attuned to public needs and expectations be developed using the bottom-up end use analysis, and you described briefly for us both what you saw as some of the problems with the supply side scenarios that are in DSPS and briefly what you saw as the need to do the demand side end-use analysis. Can you perhaps just describe for the committee the kinds of things that we end up with if we fail to look at the end-use bottom-up approach?

Dr. Connor-Lajambe: What I would like to do and have done for Quebec, for instance, is we have all the sectors. We have roughly four sectors. Each of those sectors has different types of needs. These should be differentiated by the quality of energy needed. It can be really electricity. It can be locomotion. It can be motor engines. It can be light. It can be heat at a certain degree. There could be at least three categories of heat that should be looked at in a different light all together.

In some industries they have really done fantastic progress in looking at their own energy needs and cascading using the higher heat to heat the buildings after they have done the industrial processes. This should be done industry by industry, building by building and I think it is being done, mainly in the case of industries in some provinces. It could be done also for the residential sector. We could have a bit of an indication of what the needs really are today and also for tomorrow by studying the evolution of the technology implied.

We know now that lights could be 10 times more efficient. We know that fridges could use one third, one quarter of what they use now. All this should come into the picture. At the same time, it would have a direct implication of the need for future appliances. There would be a sort of overall strategy that would develop just from really knowing what our energy needs are and which could give indication to our industries. They would know what type of heaters we need. All this could sort of generate a lot of activities around Ontario Hydro planning and could be part of a consensus, concerted overall strategy for the future. And, when you look at 20 years into the future, it is very interesting.

That is the type of end use that could also make sure that we have a good grasp of what the energy question is. Few reports really start by asking, "What is energy?" and going to the thermal dynamic aspect of it. However, that is where we should start. That is what I mean.

Mr. Charlton: Just briefly, as a follow-up to that, the Minister of Energy (Mr. Wong) in his opening remarks to our committee suggested that he was somewhat disappointed with Hydro's demand side numbers in the DSPS. I think what you are trying to say to us is what a number of others have said, is that if we were to do end use scenarios, bottom up end use scenarios, that we end up with not only a much clearer picture of the real range of demand side potential, but you end up with a much clearer picture of how much of that demand side is available at what cost and therefore presumably how quickly. Is that essentially what you are saying and in essence if we want as a committee to be saying to Hydro at the end of our process here, that we as well are not happy with their demand side approach and their demand side numbers, that in fact they are

going to have to do exactly what you are recommending?

Dr. Connor-Lajambe: Understand right away that to implement a policy coming out of that, they would need the involvement of the population. To have a successful policy, you need to have the public embark into it and it is only successful by putting them into the process very early.

Mr. McGuigan: Looking at the spread we have here now and the poor showing of Ontario and Quebec, I have often wondered if independent of the energy and investment balance in the character of our industry in Ontario, going back to our very beginning, based upon extracting forest products, mineral products, agricultural products from the land where abundant energy has allowed an individual person to extract an awful lot of dollars' worth of product in a day. A person operating mining equipment, agricultural equipment or forestry equipment today probably turns out several thousand dollars' worth of material per day, and that sets up a system that requires a huge investment and, along with that, gives high returns, high salaries and so on and perhaps locks Ontario into that sort of manufacturing regime whereby industries that require a lot of hand work, detailed work and so on tend to move to other manufacturing countries.

What I am trying to point out is that perhaps what we do here in Ontario really cannot be turned around overnight because of the nature of our manufacturing, and it is really not because of that energy ratio.

1500

Dr. Connor-Lajambe: It may be a wider problem, but the way we have approached energy policy is part of it. I am not saying it is only energy policy which has kept us on the negative side all the time, but it contradicts totally what some people have been saying, that energy is good for regional or national development. It is not enough to put us into the positive side. We have to work at it more.

Mr. McGuigan: On another subject, you said there should be a sort of control body to have authority to say to Ontario Hydro, "Yes, go ahead," or "No, don't go ahead." Would you see this as a select committee of the Legislature, or would you see this as a group outside of the Legislature?

Dr. Connor-Lajambe: It seems to me it will have to be an ongoing body, because energy policy has become a very crowded field. Over only the past 15 years, there has been a tremendous growth in activities in that domai and we have seen energy take an unprecedent space in economic life, so it would require a bo of experts very much like the National Ener Board, but with real powers, let's say. We real need to have this as a steady source information and resources on an ongoing basi as its sole activity.

Mr. McGuigan: Thank you.

Mr. Chairman: Mr. Runciman, do you ha a short question?

Mr. Runciman: A very brief one. There w an article in one of the Toronto papers, interview with the Minister of Energy. It said th one change the minister has already discuss is turning Hydro into a more active tool f Ontario's economic development. As an e ample, he cites Hydro building a power project a depressed area to create jobs and spur oth investment. I would like to hear your reaction that.

Dr. Connor-Lajambe: It depends what ty of investment. Is it a dam or is it nuclear?

Mr. Runciman: A power project; he does n say.

Dr. Connor-Lajambe: There are some pow projects which have the ability of generati activities. If you think of a biomass pla somewhere, it would require local people gath ing and having a trucking company–you kno the sorts of things that will bring perman activity on this behalf and have the effect generating other types of industrial activit Possibly, it could become a place where th would exploit biomass in different ways. If t resource is not overexploited too fast, it could a real, lasting project. It all depends on the ty of project it is.

If it is a conservation project, then you hav really, an activity that is not going to exhaust t resource and will provide jobs which will not only in construction, but constant. It depends the type of investment.

Mr. Runciman: That is a good politi answer.

Dr. Connor-Lajambe: It is an economi answer.

Mr. Richmond: Just to briefly summari let's hypothetically say you were appointed the board of Ontario Hydro. What immedi changes would you press for to the way the utili operates and the way in which it is pursuing th demand-supply strategy study?

Dr. Connor-Lajambe: I would start looking at demand with the uses.

Mr. Richmond: So an end use–

Dr. Connor-Lajambe: Definitely. This way it would also solve part of the institutional problem which needs to be looked at in a more long-term view, because when you touch institutions you really have a tougher job than just making studies. It would be first the end-use approach, then bringing itself this institutional transformation and reversal of supply approach.

Mr. Chairman: I would like on behalf of the committee to thank you for coming and presenting your paper to us and for discussing it with us this afternoon.

Dr. Connor-Lajambe: It was a pleasure. I wish I could do it in Quebec.

Mr. Chairman: Our next witness is Professor Michael Berkowitz. We have just distributed his paper on the opportunity cost of resources used for electricity generation in Ontario.

There is a microphone you can clip on your lapel for the benefit of the recording and for Hansard. I suppose it is more a collection of your overheads than a paper, is it not, that you have just handed us? I will turn the floor over to you.

There appears to be no lapel mike. While we are waiting for one, I do not know if perhaps someone could work the overheads for you and you could talk to us. We want it recorded for Hansard, so I need you to speak into a microphone. We will dim the lights and turn the floor over to you.

MICHAEL BERKOWITZ

Dr. Berkowitz: I would like to take the time I have available today, short as it is, to talk about the opportunity cost of resources used for electricity generation in Ontario.

Before I begin, let's define what we mean by the opportunity cost. Edwin Mansfield in his 1982 intermediate textbook says: "The opportunity cost of producing a certain product is the value of the other products that the resources used in its production could have produced instead."

Suppose we focus just for a moment on the regulated private utility sector. For example, suppose we look at firms like Newfoundland Light and Power Co., Maritime Electric Co., Canadian Utilities or Consumers' Gas Co. We might then ask the question: "Why is there the need to be aware of opportunity costs in the case of these regulated, privately owned utilities?"

The answer is quite straightforward in this case. The Supreme Court of Canada has ruled that private investors and regulated utilities are entitled to a fair return on capital supplied to the firm.

1510

Looking now to crown corporations, they ask the question, "Should this principle of fair return to investors be rejected simply because the resources have been contributed by taxpayers to a crown corporation rather than by shareholders and bondholders of a regulated utility?"

Resources do not suddenly cease to be of value simply because they are acquired by public crown corporations rather than by privately owned corporations. What, may we ask, are the problems in implementing the opportunity-cost concept for a crown corporation?

First, since Hydro is a crown corporation, we have to consider the wider issue of social opportunity costs.

Second, since Hydro has no shares traded in the marketplace, it is not practical to use the conventional methods for determining a fair rate of return. That is unlike the case for a regulated private company, where we determine the required returns on the bonds and shares outstanding for the company and then weight these required returns by the percentage of capital in each of these bonds and stocks. Because there is no stock outstanding, we cannot use this method.

Third, since Hydro's debt is guaranteed by the province, its capital structure is artificial.

Let's address the first problem. What is the social opportunity cost of capital for Hydro? Any economist would tell the following story, as my predecessor who just spoke basically told it. As the government of Ontario borrows more money, interest rates throughout the economy increase. This increase in interest rates would be faced by private firms that would otherwise take investment. Now, because of the higher interest rates, they forgo this investment. This is what we referred to as crowded-out private investment caused by increased government borrowing.

At the same time, these higher interest rates have the effect of causing consumers to postpone consumption. Higher interest rates encourage them to put more money into savings and postpone consumption. This is what we refer to as crowded-out consumption.

The social opportunity cost is the weighted average of this cost to private investment crowded out and the cost to current consumption crowded out, where the weights represent, in this case, W, the sensitivity of interest rates and increased government borrowing.

Suppose that capital markets are perfect–the simplest case. Suppose that capital markets are

perfect–that is, we have no transaction cost, no taxes, everyone has perfect information throughout the economy and so on. If that is the case, the cost of private investment crowded out is exactly equal to the cost of the current consumption crowded out. It therefore follows that the social opportunity cost is the before-tax weighted, average cost of capital for an equivalent-risk private firm.

But we know that capital markets are not perfect. There are taxes. Taxes drive a wedge between the private investment crowded out and the current consumption crowded out. Taxes make the cost of private investment crowded out greater than the cost of current consumption crowded out so that the social opportunity cost that we have just defined no longer holds.

The critical question then is how sensitive Canadian interest rates are to government borrowing. That is the critical question. Alternatively, we can ask whether private investment is crowded out by government investment in Canada.

Unlike my predecessor, I strongly believe–and I will provide some evidence for it–that that is not the case. There is no private investment crowded out by government borrowing, not if we consider the integration of capital markets across borders and the flow of funds provided by that integration.

What evidence can I give to demonstrate this integration of Canadian and US capital markets?

Let's look at equities; for example, the equity market. There are a large number of Canadian firms traded in the US market, unlisted exchanges and over the counter. The prices of these interlisted stocks are determined, moreover, in the US equity market. There is evidence provided of that, which I can cite.

Second, US and Canadian markets move closely together. If you look at the degree of that relationship and try to quantify it, try to measure it, it is somewhere between 0.7 and 0.8, where one represents perfect correlation, so between 0.7 and 0.8 represents strong co-movement between these two markets.

Third, for debt securities, foreign exchange risks can now be completely removed by using forward foreign exchange contracts. In other words, today a Canadian firm can issue debt in US dollars up to 10 years and, at the same time, buy US dollars in the forward market for payment of all its principal and interest payments up to that time and completely eliminate all the foreign exchange risks.

Finally, for debt instruments, again, there i development of a huge swap market whicl allows Canadian firms to raise money in foreig markets and then swap the liabilities fo Canadian-dollar liabilities.

We also recognize that Ontario Hydro's ow economist, Peter Spiro, in a working paper, cite that he does not believe there is any crowding ou of private investment in Canada, and he gives a evidence that even in the US market there is n crowding out when the US government, which i much greater, borrows. Hence, this suggests tha little or no private investment is crowded ou when the government invests.

What, then, is the correct social opportunit cost for Ontario Hydro?

The social opportunity cost is then simply th weighted average cost of the alternative privat investment. Therefore, the opportunity cost o funds employed by Hydro is equivalent to a similar-risk private firm. Such a firm, remember would not benefit from any debt guarante currently bestowed upon Hydro by the province.

Let's take a look at that guarantee in a little bi more detail. What are the effects of th guarantee?

First, financing costs faced by Ontario Hydr are lower than they would otherwise be withou the debt guarantee. What effect does this have? A lower cost of raising funds results in a bia towards more capital-intensive technologies t produce electricity.

The second effect of a debt guarantee is tha electricity rates are too low. These lowe electricity rates encourage greater demand fo electricity relative to the alternatives that migh be used–natural gas, oil and conservation–and, because of that, this demand is met by greate investment.

If the debt guarantee were eliminated, how would Hydro's cost of raising funds be affected?

Hydro's cost of debt would certainly increase. We know that.

Second, the level of debt financing in its capital structure would no longer be 83 per cent. It would be something much lower.

If we compare Hydro's 1988 forecasted capital structure–which is 82.3 per cent debt, no preferred shares and 17.7 per cent common equity, which is composed of accumulated surplus for debt retirement, rate stabilization and contingencies–to what Hydro's capital structure would be in the absence of a debt guarantee, we see that, in the absence of a debt guarantee, Hydro's debt is estimated to be at 50 per cent. It would have 11 per cent preferred shares and it

would have 39 per cent common equity. I am not at this time going into any of the modelling that we used to estimate this capital structure, but if there are any questions, I can go into it in greater detail later.

1520

Now, how does this notional capital structure, or the capital structure that Ontario Hydro would realize in the absence of a debt guarantee, compare to private electric utilities in the United States? Let's compare. With respect to US electric utilities, I said that Hydro's debt should be 50 per cent. The median of 100 US electric utilities is 48.4 per cent–very close; preferred shares, 11 per cent, relative to the US median of 10.1 per cent; and common equity, 39 per cent, relative to 41.5 per cent. Again, Hydro would fit very closely with the median US electric utility.

How does Hydro's notional capital structure compare to that of US private utilities of similar risk? Certainly if Hydro's debt guarantee were eliminated, it would be likely that the rating on Hydro's debt would depreciate from triple A down to double A, perhaps even A. If you look at Hydro's capital structure, compare it to the double A and A firms, where some 65 of the 100 US utilities lie, we see that Hydro's capital structure, its notional capital structure, in the absence of the debt guarantee, would fit very comfortably in the double A and A range.

We can then ask, what would Hydro's cost of funds be in the absence of a debt guarantee? At this notional capital structure of 50 per cent debt, 11 per cent preferred equity and 39 per cent common equity, estimating the various costs of these sources of funds, we would have the debt at 12.1 per cent. What we have done is essentially to increase the embedded costs of debt to take into account the reduction in the debt rating of the company if the notional capital structure evolved. We have preferred equity cost of 7.94 per cent and we have a common equity cost of 11.25 per cent. This would result in a cost of capital for Ontario Hydro of 11.31 per cent. That is a nominal cost of capital of 11.31 per cent in 1988.

What effect would this have on the net income for Hydro in 1988? Well, if we look at Hydro's average rate base, 1987 and 1988, it is $24,164,000,000. If we multiply that by this 11.31 per cent cost of capital, we come up with an income before financing charges of $2,733,000,000. If we deduct from that Hydro's own forecasted financing charges of $2.18 billion, we come up with a net income figure of $715 million for 1988. Contrast this with the $414 million forecast by Hydro for the same period of time. Also compare it to the Ontario Energy Board's last recommendation for Ontario Hydro of $515 million, noting that it may go as high as $700 million. Note as well that if there is crowding out, if we allow for crowding out, if we allow that there is some effect on the interest rate from the increase in borrowing, the income that we generated here would be even greater.

Let me leave you with the final questions. First, what should be the disposition of the incremental revenues generated by Hydro? I do not have any answer for this. I will give you three possibilities. One is that some of Ontario's debt might be retired with this incremental income so that this notional capital structure that we talked about would be achieved over the long run.

Mr. Runciman: Radical idea.

Dr. Berkowitz: Second, the incremental income would possibly be put into the general revenue account of the province. Third, tax credits might be given to users of electricity.

The second question I have is, what impact will these higher rates have on consumers of electricity in Ontario? That will very much depend on whether this jump in electricity prices occurs all at once or is phased in–that is, the short-term versus medium- and long-term effects. If there is an all-at-once increase in electricity prices to reflect what I have been talking about here, then in fact in the short term there may need to be some adjustments for some sectors and some individuals.

Third, does the Ontario government knowingly wish to subsidize electricity rates relative to natural gas, oil and conservation, as it presently does? We could talk more about that afterward.

Fourth and finally, does the Ontario government knowingly wish to provide incentives for further nuclear generation, as it presently does?

These are questions I do not have the answers to. These are questions that need further study, but they are questions that definitely need to be answered. Thank you.

Mr. Runciman: I guess, like most members of the committee, I am in a bit of a quandary here. I am not sure if the witness is suggesting that this is the way to go. I would like him to be a little more specific, at least to clear it up for me. Is he suggesting that this is an appropriate thing to see happen with respect to Hydro?

Dr. Berkowitz: I am not suggesting that Hydro's capital structure be changed, either in the short run or even in the long run, to this notional capital structure. In other words, there is no way we are saying here in this document that we should privatize Hydro; that is effectively

what we would be talking about. What I am saying is that, instead, Hydro should operate as if it had this capital structure. It should make its investment decisions as if it had this capital structure and operate with this cost of funds, even though it may not. Then any incremental income generated could be used in any of the number of ways I talked about.

Mr. Runciman: Just on the other side of the equation, what impact would this have on Ontario? Obviously, you assume it would be positive as well. What would you foresee happening in that respect?

Dr. Berkowitz: There are two ways to answer that questiont. One, the firms that compete with Hydro–for example, Consumers' Gas, Union Gas, oil companies, other conservation groups and so on–certainly would benefit because presently there is a bias towards electricity use because of this debt guarantee alone. Private firms that are regulated do not receive the debt guarantee. Consumers' Gas and Union Gas do not have a debt guarantee. They go out and borrow in the capital market, and the chips fall wherever they do. There is no debt guarantee. Certainly on a relative price basis they would benefit.

On the other side, people who use electricity, firms, industries that are highly intensive electricity users, at least in the short run would be disadvantaged. In the long run or in the medium term, changes in technology to become more efficient would lead to more efficient production. We saw this happen in Germany. We saw it happen in Japan in response to increased oil prices in the 1970s. We took a position in Canada that oil prices should adjust only gradually to the world level. With those countries that adjusted faster, their economies did not suffer. We have only to look at that and I only draw that analogy to what I am talking about here.

Mr. Runciman: The previous witness was suggesting that because the emphasis on energy development which had an impact in terms of growth in the manufactured goods sector was on the negative side of the ledger that you obviously do not think the crowding-out theory holds water. So we really have opposing theories.

1530

Dr. Berkowitz: Right. I have not seen one firm that has been crowded out of the market. I agree with what she stated in that respect. All the evidence suggests that there is no crowding out–the evidence that I give and the evidence cited by Hydro's own economist, Peter Spiro. I have never seen one firm crowded out.

Through our lawyer, at the last Ontario Energy Board hearing, I asked Ontario Hydro's own financial witness the exact same question. He could not state that he knew of any firm that was crowded out of the market. So we talk about private investment crowded out and I have never seen any example of it.

Mr. Runciman: I am just trying to relate that to concerns about the provincial and national debts and the fact that that is in itself going to have an impact on economic development. That seems to go in opposition to what you are suggesting as well.

Dr. Berkowitz: We are talking about a reduction in the level of borrowing. Currently Hydro has this \$23-billion capital base, of which 83 per cent is financed through debt. We are not talking about increasing its capital structure; we are talking about reducing the level of debt financing it through more of this income that is generated, for example.

Mrs. Sullivan: I am quite interested in this. I am not sure that I understand it all but I am going to fire away anyhow.

One of the things that quite strikes me is that a lot of the borrowing that Hydro is doing now is really to refinance maturing debt. I am wondering why it would be to anyone's advantage to refinance at what indeed is a higher rate, or at least even to notionally refinance at a higher rate than what we would be paying using the guarantee. Why would they change their methods of calculation to get a different bottom line?

Dr. Berkowitz: Why would they do what I suggest?

Mrs. Sullivan: Yes.

Dr. Berkowitz: They would not. In fact they do not even think it is an issue. Ontario Hydro does not believe that this whole question is an issue.

It is a question of interpretation. The Power Corporation Act states that Ontario Hydro should provide power at cost. Now we are talking about what is cost. Hydro has its definition of cost. We believe that cost should include the economic cost of that capital as well as the historic cost of everything. They hold to their guns, and their lawyers do as well, and say that cost does not include any recovery of this economic cost. They do not even believe it is an issue until it is decided at your level.

Mrs. Sullivan: I am not sure that I think it is either, but I am not sure that I understand it well enough.

Certainly one of the things that would happen f Hydro went into the use of your notational :apital structure would be that rates would go up ınd, once again, that does affect the power-at-·ost scenario. Do you think there would be great ejoicing in the streets of Ontario if Hydro ıdopted that kind of policy when indeed there is ıot an effect other than that of increasing rates?

Dr. Berkowitz: There is another effect. Resources would be used efficiently throughout he economy, if that is what we want, if the goal s to have resources used efficiently.

Mrs. Sullivan: How would that happen?

Dr. Berkowitz: In the same respect, in the 970s, when oil prices were going up at the world :vel and they were sheltered here, we did it for olitical reasons or we did it for other reasons; we ept oil prices down. In other countries, oil rices went up a lot faster. Technologies adjusted nd the people are not worse off now than we are.

So the question is, do we want our resources cross our economy efficiently priced? Do we 'ant to give electricity an advantage over natural as? Is there some reason for doing this? That is 'hy I ended with that question, okay? If there is ome reason, if we want to do that, then in fact 'hat we are doing now may not be wrong. The oint I am making here is that that is what is oing on today, and we should at least know that ıat is what is going on today. If that is what we ant to go on, let's continue.

Mrs. Sullivan: Would you make the same ıggestion for other crown agencies?

Dr. Berkowitz: Any crown corporation that ıs a debt outstanding that is guaranteed, and I do ɔt know of any that do not.

It is a very fundamental problem. In a private ɔmpany like Consumers' Gas, the shareholders quire a return on their investment, the bond-ɔlders require a return on investment, the eferred shareholders require a return on invest-ent. In Ontario Hydro, the taxpayers of this ovince are investors; they are the shareholders. ne moneys that are put up to finance investment that corporation could have been put some-here else. Should the prices of electricity reflect is or ignore it? As an economist, I would argue at the prices should reflect this economic cost.

Mrs. Sullivan: I think I am going to have to do ore reading on this before I ask any more ıestions.

Mr. McGuigan: To continue that same line of ıestioning, I guess for a sense of purity in onomics I could agree with you, but from a actical point of view, as a user of electricity and a person who is always struggling to get money to invest in my own business, it seems to me that any dollar I save on having a little cheaper hydro than might otherwise be if we followed absolutely pure forms I have to invest in something else. In the final analysis, other than, say, your relationship with gas, I do not see where it matters.

Dr. Berkowitz: It matters with respect to conservation as well, because that is another option.

Mr. McGuigan: I guess you get into the philosophy of conservation, but most people would say that gas is finite and electricity is less so, because a good part of it is generated by moving water. I know you can get into arguments on nuclear, but I think it is less finite than natural gas. Of course, the coal portion is not. I think you can develop lots of arguments that it is in the public interest to use hydro rather than the materials that are finite and also tend to pollute.

Dr. Berkowitz: I would not argue that hydro generation is good, but the sources are certainly being used up quickly. Perhaps encouraging small hydro generation might be a route to go. You see, I am making no judgement about which way things should go, what the future should look like. What I am saying is, simply, let prices decide, let the market decide, unless there is some other reason for the government deciding by fixing prices in some way. The guarantee is in some way a fixing of prices. Otherwise, just let the market prevail. If in fact it is cheaper to use hydro, then that is what will be done. If conservation is the best route, that is what will be done.

Mr. McGuigan: I really cannot quarrel with your presentation, then. Thank you.

Mr. Brown: Just to follow on that, it seems to me that Ontario Hydro has a mandate to provide power at cost–that is in the Power Corporation Act and that is what they are talking about–and they are required by statute to pay 2.5 per cent of their debt back every year. I wonder if that does not in some way take into account some of the concerns you have. Have you factored that in? Is that a realistic number to be paying back?

You are saying that we should include the actual cost of borrowing or what would be the true cost of borrowing if in fact it was a private corporation. By statute they are paying back 2.5 per cent which we as consumers, corporations and industrial people pay anyway. That is right there. Does that not take some of this into account?

1540

Dr. Berkowitz: As long as the demand is increasing and investment is increasing to meet that demand, there is greater borrowing because 80 something per cent of the capital Hydro raises is through debt. Even though it is paying back 2.5 per cent, its increased borrowing more than compensates for that. If you look at Hydro's capital structure over a number of years, it is in the 85 per cent to 90 per cent range. It does not go down to the levels of some private competitive firms. When I say "competitive," I mean a competitor of Hydro.

Mr. Brown: I have a little bit of a problem in that the total assets of Hydro have been paid, to my mind, by the people who use electricity in this province, because it started as a crown corporation with a loan guarantee of a very minimal amount at that time–at least it seems so to us; I suppose our predecessors here did not think it was a minimal amount–and has moved to a corporation which has huge assets.

Granted it has huge liabilities, but it has huge assets and has had absolutely no taxpayers' dollars, to my knowledge, spent on it, other than the loan guarantee, which did not cost the province, from what I can gather, anything at all. There must have been some return on equity there because there was no equity to begin with. Now we have a substantial one.

Dr. Berkowitz: But if you are charging rates to cover the cost of repaying the debt–if you are only covering the cost of repaying the debt, which finances those assets, and the cost of providing that electricity, the fuel costs, labour costs and so on, then the opportunity costs to the shareholders, the taxpayers, are being excluded. You are only covering the direct cost. You are not covering the full economic cost.

Remember the first thing I did here was define what I meant by opportunity cost. The opportunity cost is the cost of producing a product. How we define it is that the opportunity cost of producing a certain product is the value of the other products that the resources used in its production could have produced instead. That is how we determine what a shareholder gets in a private company. What can the shareholder do with this money by investing it in a similar company of similar risk? That is how we determine what a shareholder gets. Why should the process differ here?

Mr. Brown: I understand your reasoning and I think I totally agree with your reasoning, but my problem is that I do not see Hydro as having any equity that came from government. That does not make any difference. You do not think that th 2.5 per cent that is factored in makes muc difference.

Dr. Berkowitz: It has 17 per cent equity.

Mr. Brown: Book equity.

Dr. Berkowitz: Right.

Mr. Brown: As you point out–

Dr. Berkowitz: That is much too little.

Mr. Brown: Ontario Hydro will argue that i fact it does have about a 50 per cent equity if yo take what its actual assets are rather than boo equity.

Mr. Runciman: Having a couple of mor minutes to reflect upon this, I appreciate what ou witness is saying but at the same time there is sort of situation where electricity consumers i effect are supposedly or theoretically getting break because of the loan guarantee and the fac that Hydro was able to borrow funds at a lesse rate. Of course the argument comes in on the sid of what are the real costs of production of energy But in my view, the real costs are indeed at lower rate because that is the money that is bein made available to Hydro.

Perhaps you could comment on this. We ar dealing with alternative sources of energy. Yo mentioned natural gas, but we have had a numbe of people appear before us in terms of cogeneration, wind power, whatever, and we have talke about providing those firms and individuals wit an appropriate price level. We have been talkin about comparing it with, say, nuclear or wha have you as the best available price.

I am wondering how you would feel about although not necessarily following your suggestion in terms of Ontario Hydro operating as private utility, but if indeed one were looking a developing pricing mechanisms to suggest powe purchase from, say, cogenerators or paralle power generators–that bias, if you will, tha built-in break being incorporated into thos figures that are being placed before the alternative energy suppliers.

Somehow that break that Ontario Hydro i receiving through the loan guarantee should no deter–and that is what is happening now–thos other sources of energy. You are not cutting of your nose to spite your face by taking the benefi of reduced borrowing costs away from Ontari Hydro; at the same time, on the other hand, yo are reflecting that break through the costin mechanisms or the purchase mechanisms available to alternative energy sources. I do not know I would just like to hear your views on that.

Dr. Berkowitz: One way to overcome subsidy certainly to subsidize the alternatives. If you ıbsidized them in the correct way, relative rices would in fact be unchanged. We would ave efficient allocation. I would be happy, but ou would see no difference in use either from hat I was recommending, when you would just iminate Ontario Hydro's debt subsidy.

On a relative standpoint, I am always looking a consumer, whether I purchase electricity or as, at the relative price of electricity to gas. If e price of electricity goes down by 10 per cent nd the price of natural gas also decreases by 10 er cent, my consumption does not change. The nly thing I have done is made it much more omplex.

Again, that has been the federal government's pproach in the 1970s: you subsidize this source, subsidize that resource, give tax eaks, depletion allowances and so on and so rth to the oil sector; you have to do similar nds of things in the gas sector, and things get so ixed up. You would have the same overall fect by not giving anyone anything and it is uch simpler in that way.

Mr. Runciman: I guess it is simpler in some spects, but on the other side of things, you nnot get away from the fact that the utility, ght or wrong, is getting favourable rates. If you ke that down the line, the consumers are getting vourable rates in that one particular commodi-. Whether it is right or wrong–

Dr. Berkowitz: Right. That is the question I k too. I am not making a judgement.

Mr. Argue: I have one question, getting back the crowding-out effect. I am wondering, as pital is a finite resource and there has been a lot discussion about why interest rates are as high they are right now, whether generally–I am t suggesting that Ontario Hydro is a principal rt of that; it follows from world capital markets nerally–if one investment is given preferential atment, it affects the cost of capital available other investments that have less preferential atment.

Dr. Berkowitz: The question is, if one vestment has a lower cost of capital, does that fect the distribution of investment?

Mr. Argue: That is right.

Dr. Berkowitz: Yes, absolutely. That is what were just talking about.

Mr. Argue: Again, I think there has been me clouding of the issue by talking about st-of-power issues which are really rate issues. e are considering the demand/supply planning strategy which is looking at choosing demand/ supply options for the future; this committee is principally looking at that question. It comes again to this question of what the cost of capital is right now to Ontario Hydro. It has suggested in its documents that a discount rate of four per cent is appropriate in considering investments over the longer term. I am wondering whether you have any insights to offer the committee on what your analysis says to what someone would use over the next 20 years as being a cost of capital to a public utility without looking at whether there are subsidies or not.

1550

Dr. Berkowitz: You cannot avoid the question of subsidies. I am assuming the number you gave me was a real number, the four per cent.

Mr. Argue: Yes, it is.

Dr. Berkowitz: The number we came up with, 11.31 per cent, would translate to approximately seven per cent if we have about four to five per cent inflation over the long run, which most economists are projecting. If you take that into consideration, then we have about a seven per cent real cost of capital. That, I would suggest, is a long-run cost of capital because it takes into consideration this idea of notional capital structure which is an adjustment to a long run.

Also, if you look at that seven per cent, it is within the bounds that most economists are projecting for the social opportunity cost of investment in Canada. It has ranged from seven per cent by Burgess up to 10 per cent by Glen Jenkins. Even if they come at it in a different way than we do because we are financial economists, we still come up with very similar rates. The long and the short of that is that I would argue this seven per cent would be the rate they should be using over a long-run period.

Mr. Chairman: Seeing no further questions from the committee, Professor Berkowitz, I would like to thank you very much for coming today to speak with us and discuss your paper with us.

Our next witnesses will be Kevin Cliffe and Nick Macaluso from the Department of Energy, Mines and Resources. Come forward, please.

Mr. Cliffe and Mr. Macaluso are going to be summarizing for us a portion of a study done by Peat Marwick for the federal Department of Energy, Mines and Resources that dealt with the employment impact of energy management investments. Please introduce yourselves for the

benefit of Hansard and then we will proceed with the session.

DEPARTMENT OF ENERGY, MINES AND RESOURCES

Mr. Cliffe: Thank you, Mr. Chairman. Ladies and gentlemen, my name is Kevin Cliffe. I am currently the assistant director of the co-ordination and strategic planning division at the Department of Energy, Mines and Resources.

We are responsible for looking after the policy and the economic aspects of conservation and renewable activity in Canada, and the design of policies and programs to realize the potential for conservation within the country.

Mr. Macaluso and myself are here to talk about the results of our major study, the employment impacts of energy efficiency and energy conservation investments in Canada. Before I get into the results of the study, what I would like to do is put the study into context and effectively do three things for you.

First of all, what we want to show you is that these investments are cost-effective vis-à-vis supply options. We want to quickly review the status of those technologies, particularly as they displace electricity.

We also want to show that the market share and penetration rates of these technologies are low, implying that there are significant barriers to their penetration, and also to show that these investments are consistent with other government goals and objectives such as job creation, which is the main topic of the discussion, but they are also consistent with environmental aspects as well as competitiveness.

In looking at the relative cost of conservation versus supply, we put together this following chart, which outlines estimated costs of electricity supply in cents per kilowatt-hour from nuclear, hydro and fossil-fuel production, and a comparison of those costs with the costs of saving energy or displacing electricity from a variety of conservation activities such as high-efficiency lighting, high-efficiency ballasts, variable-speed drives, residential heat pumps, high-efficiency motors and other energy management controls and technologies.

When we look at the cost-effectiveness of these investments, we are talking about discounting the future value of the energy produced at seven per cent real, which is a standard social discount rate used in most of the analyses we are undertaking right now. In a sense, it is a national perspective, a socioeconomic perspective, if you will.

What this chart shows us really, looking at the conservation side of things, is that most technologies we are looking at are displacing electricity at about two and a half cents a kilowatt-hour. Most supply-side activities are talking about generating or producing electricity in the neighbourhood of four cents or closer to five cents a kilowatt-hour, which is a significant difference. It shows that there is a good cost-effectiveness comparison between conservation and supply.

That previous chart is really saying that this is from a nice economist's perspective of the world, really having nothing to do with market-oriented policies, economies, operations or anything like that. What we decided was that in order for us to see what was happening we had to take a look at conservation from both perspectives. In doing this, we decided that looking at the market shares of these technologies and seeing how quickly they were moving into the marketplace, how fast these technologies were displacing electricity, would be a good gauge of how the markets were actually operating in this area.

What we basically saw is that for a number of these technologies such as the variable-speed drives, residential heat pumps, efficiency motors and efficiency lighting, their market shares are very low and these technologies are penetrating the market at a very slow rate, about one per cent a year, which, relatively speaking to some other technologies, is an extremely slow rate of penetration, particularly when you take a look at the average payback, which seems to be the guiding light for most investments in the private sector, whether it be industrial, residential or commercial.

They have pretty attractive paybacks–three years, in some cases down to four to six months–which really indicates to us that there are significant barriers to the penetration of these technologies, barriers such as lack of consumer information and technical awareness, and also the perception about the technical performance of some of these technologies and the perception about their paybacks.

This is one I just want to touch on quickly here. It is this price situation and the perception that in the consumer's mind there is very little need to conserve or displace energies given their current low world oil price situation. The fact of the matter is that it is a current world oil price situation, not an electricity situation. What we have done here is taken a look at how rapidly domestic and international oil, gas and electricity prices have changed since December 1985. We see two things in this chart:

The export price or the international price that ›u see there has dropped significantly for oil ıd natural gas, but the prices paid by consumers ıve not dropped accordingly. We are not getting e clear price signals coming through in our arket-based price system as we are in the ternational level.

What is also clear in this chart is that the price electricity has risen since December 1985. ranted, some people would argue that that 10.5 r cent or so is just inflation and electricity ices have maintained their real terms, if you ill. The important thing is the direction; that is y in this slide. Again, this points to some of the ırriers we see in the conservation side of things, well.

The policy question you have to address is that ›u have got this consumer perception that there very little need to conserve energy regardless the fuel that is being displaced. We are in an ıvironment where we have low oil prices, ›viously we know we have got fiscal restraint ıd we have a market-oriented approach by ›vernment. Maybe what we are looking at is a uation where market operations are not that ıd, but one can assess that only if one looks at hat benefits are being forgone by the inactivity the marketplace in this area. That is really hat led us to the assessment of the employment ıpacts. We felt this was one area which is a ıncern of governments and it is one area where can better identify what the benefits to the onomy of job creation in the industry are like.

00

We looked at the employment impacts from o perspectives. We used the input-output alysis at both the national and provincial level take a look at the direct, which are the jobs nerated in the manufacturing and installation these technologies, and the indirect, in other ords, employment inputs going into the manu- cturing process for these technologies, and oked at the employment lost in the energy pply and distribution industries as a result of vestments on the conservation side.

We looked at seven categories of investment. is not the full range of investments we are lking about. What we narrowed it down to were vestments that were for the retrofit markets. e did not take a look at investments that dealt th the installation of, for example, new uipment into a new building. We just looked at retrofit side, which in a sense dampens the nployment impacts from these activities.

In general, what we have found is that vestments in this area are labour-intensive and require a significant amount of labour. Most of the firms are to a certain extent vertically integrated so that they are dealing with a distribution and installation element of the activity and they maintain an ongoing employment base.

We also found that these jobs are relatively inexpensive to create and, most important, that these jobs are generally created where the investment takes place, so that activities in this area can be regionally targeted or targeted very specifically to areas where there are employment difficulties.

Just to give you a perspective of the labour-intensive nature of efficiency investments, we took a look at a number of supply and conservation comparisons in this area. What we found was that, on average, supply activities generated about 10 to 12 person-years per $1 million of investment. Nuclear and thermoelectrical plants generate–pardon the pun–about 17 PYs, a little more intensive than some of the oil and gas developments we looked at. We also found that conservation generated about 24 person-years per $1 million of investment in the area.

To make the point a little clearer, we flipped the equation around and looked at the cost side. In terms of dollars, with conservation you are looking at about $45,000 to generate a person-year of investment; on the supply side, you are looking on average at about $75,000 and in some cases up to about $165,000 to generate a person-year of investment.

What is important about the conservation jobs is that they require low and medium skill levels, which are very important considerations if you are talking about integrating a conservation program with, for example, a job retraining scheme or other type of activity in that area.

I do not think we will go through this slide. I want to make one comment before we go. I mentioned that we took a look at the net jobs created; that is, adjusting the conservation jobs for jobs lost in the energy supply industries. We took the assumption that the jobs in the supply industry would be lost for the time required to pay back the conservation investment. As we saw in the earlier slide on market penetrations, we assume the job loss is going to be for about three years.

We are not certain how accurate that assumption is, but we felt it was a reasonable one to make within the context of the study. What that meant was, on average, the 20,000 person-years that were created by this conservation investment

would have to be dropped down by about 20 per cent to reflect the job loss. In other words, we are talking about 1,500 person-years per year that would be lost in the supply side because of investment on the conservation side.

Regardless of how we wanted to look at it, we still saw the conservation investments coming out as being very positive in their job creation aspects. Just to touch on the regional aspects of these activities, we have about 4,500 firms in Canada in the energy management industry. They are spread across the economy fairly well, except that the bulk of them are in Ontario. Of the $7-billion worth of sales from the industry, again I think just over 50 per cent occur in Ontario, so that there is a pretty positive balance in Ontario for activity within this area.

To keep the presentation shorter and perhaps answer some questions afterwards, I just want to reiterate what we have seen. These activities are a cost-effective energy alternative, they are more labour intensive, they are significant in their domestic generation of employment per dollar invested and they contribute significantly to industrial-regional growth and expansion. I think this latter point is important for the committee to recognize because what we have shown is that Ontario has the infrastructure in place to deliver energy conservation and energy management programs. Importantly, this investment stays within Ontario, not only in terms of the dollars, but also in the jobs created.

Thank you for the opportunity to appear before you. I wanted to quickly run through this so that we could answer questions, if you had any for us.

Mrs. Sullivan: We recently had before the committee people from the R-2000 program. One of the things they impressed upon us was the length of time before that program really had a takeup that has made any kind of an impact at all and, indeed, the kind of training that had to be directed to the people who were building those homes and the effect of the time of the training period in terms of getting the program off the ground. I wonder if that would be a similar factor in other areas. I assume that the market would drive timing more on the high-efficiency pump side rather than the training.

Mr. Cliffe: The R-2000 example, I should perhaps have alluded to in the presentation. That is the one example where we used, obviously, investment right from square one. The observation is correct; it takes a considerable amount of time when you are talking about a highly technical area such as the introduction of very energy efficient equipment into a new housing industry where you have to, in a sense, train the installers from the ground up.

We have a slide here that actually shows that. It is the one area where we have seen very slow action in terms of job creation in the R-2000 area, as opposed to some of the other areas where it is a retrofit activity. You are right, it does take time when you are dealing with such a massive structural change in the housing construction industry. It does take time.

Mrs. Sullivan: When we look at, say, energy-efficient motors, the distribution system for those motors is fairly standard. I suspect that there is not going to be much change in the distribution sector as a result of more efficient motors coming on; basically the same salespeople for the same companies will be selling and installing that equipment. Is that right?

1610

Mr. Cliffe: On the energy-efficient motor side of things, it is a real information awareness problem, particularly when you start talking about the smaller-end motors, the small one-horsepower and things like that. When you are getting into the larger horsepowers, what seems to be happening is not so much that there is a distribution problem as that there is what you might want to call a financial barrier or a decision-making barrier. We are talking about an average of three years payback off these investments. Industry and commercial sector investments are looking at anywhere from a year and a half to two-year payback before they will get any–

Mrs. Sullivan: Yes. That is what the people in my riding tell me. That is what they got.

Mr. Cliffe: When you have a three-year payback on a motor, they say, "That's nice, but I've got some other capital investment projects that I want to take place." Some of this high-efficiency equipment just does not get put in place because of that.

Mrs. Sullivan: I just do not see new labour being involved in any way, for example, through the introduction of energy-efficient motors. I think the other benefits of those motors are clear, but I do not see a labour impact.

Mr. Cliffe: In terms of the actual production of the motors, I think you are right to a certain extent; a motor is a motor is a motor. You wrap it one way and the fact that you have just wrapped it with a different configuration or a different type of material makes it a more efficient product.

There are a couple of things I want to point out. The motors that we talked about there and the

penetration of some of these technologies were not one of the things we looked at in terms of the job creation aspects. We looked at insulation, tightness, furnace conversions, heat exchangers, steam distribution, building system automations and R-2000 constructions and the jobs. On the economic side, we did include high-efficiency motors because we looked at them from a penetration perspective. We looked at them from the view, if you will, that a government is interested in a competitive position. I see that one of the ways we could improve our competitiveness would be to look at the introduction of some of these activities.

I hope I did not mislead the committee by suggesting that the types of technologies looked at and the penetrations were really the ones we looked at on the general side.

Mrs. Sullivan: That was going to be asked in my next question. For example, there were a couple of areas where there was not going to be a lot of change, where you saw the change occurring. When you talk about the inexpensive cost in relationship to job creation, is it your view that there is not a lot of training involved in terms of most of the conservation techniques?

Mr. Cliffe: In terms of most of them–I think you pointed it out earlier–the R-2000 is the most capital-intensive, if you will, in terms of job creation, but they are all about the same, as you can see from the slide. With the R-2000–I think you pointed it out–that is very slow to develop, that is all.

Mrs. Grier: In your slide about the market penetration of some of these electricity-saving technologies, I wonder how you had determined the extent of the market. Do you have the data in order to make an accurate estimation of what the market would be for high-efficiency lighting, residential heat pumps, etc.?

Mr. Cliffe: Yes. We have conducted a series of studies that examine, through a survey process with key users in the various sectors, their awareness, the acquisitions and the economics of some of these high-efficiency products. We have these studies available and they are giving us a pretty good indication of where things stand in these areas, particularly the high-efficiency lighting and motors and the variable-speed drives. Those are three areas we have done quite a bit of work on.

Mrs. Grier: I am interested because we often hear that we do not have the data on which to base effective end-use forecasting. What you are saying, in effect, is that you were able to get it for the purposes of your study.

Mr. Cliffe: Yes, we were. With any study, someone is going to say that data may be off here and there. From what we have seen, these are about the only comprehensive pieces of penetration analyses that have been done in Canada. We started off with a series of these studies over a period of two and a half years, basically building up the methodology and trying to refine that methodology so that we could feel pretty confident with some of the numbers that came from these works. The extent to which these can be built into some forecasts for load purposes is going to depend upon the model that will be used for that forecast.

Mrs. Grier: Do you have some recommendations for us as to how we overcome the barriers for this penetration? How does that get to happen?

Mr. Cliffe: There are a couple of ways one can look at it. First, we have to recognize that the barriers for specific technologies are specific to those technologies. We cannot assume that by definition everything has got an information barrier to it. We cannot assume that everything has an economic barrier to it. I think we have to look at the different technologies we have, the broad areas of technology. I am not saying, "Let's just look at high-efficiency ballasts in one corner and forget the rest of the thing." What I would suggest is that there has be a basic level of consumer information and awareness out there; end-user information is probably a better way of phrasing it, because people tend to think "consumers" are residential consumers.

We do need a base level of information, then we have to start targeting some of the information we have to some of the specific technologies. We also have to do some work to better disseminate some of the information we have on the technical performance of these technologies. There is a tremendous fear out there; if an industrial operator decides he wants to put in a heat pump or a high-efficiency motor, he has visions of his whole plant shutting down for three to four weeks while this activity is installed. Once it is installed, he is sitting on pins and needles about whether this thing is going to perform.

You have to get a couple of basic things across: general information, targeted information, and a better demonstration of some of the technologies we want to see penetrate the market. We have to identify which ones we want to see commercialized and how quickly we want to see them

commercialized and work towards those specific ends.

Mrs. Grier: What level of resources is Energy, Mines and Resources putting into this sector, and has that increased since your study?

Mr. Cliffe: As of September 9, Minister Masse announced we have secured a five-year, $253-million program for the energy efficiency and diversity–

Mrs. Grier: Is that assured as a commitment?

Mr. Cliffe: Yes, it is. We are in the process right now of discussing with the provinces how some of these activities might be undertaken, but it is a five-year, $253-million commitment for research and development, demonstration, information and other activities to further commercialize conservation, renewable and alternative fuel technologies.

Mrs. Grier: Has there been an update of some of the tables in the report you gave us, rather than in the slides for 1984 and 1985? Has there been an updating of those figures since then?

Mr. Macaluso: No, there has not, given the way the study was undertaken. The focus was the 1978-84 period, and the study was completed in the winter of 1986. We are looking at the aspects of going back to it about a year from now and looking at what progress we have made over the course of the years and actually projecting what type of impacts we have had under different scenarios of Energy, Mines and Resources activity in the area of energy efficiency and diversity.

Mrs. Grier: Is it your sense that the trend, for example, in retrofit investments, your table 1, has been dramatically different since 1984?

Mr. Macaluso: Some of the data I have looked at seems to indicate that the same trends are still being maintained at roughly 26 to 27 jobs created per $1-million investment on the conservation side; and the same for the supply side, the 12 to 15 range.

1620

Mrs. Grier: Did any specific policy recommendations or changes in legislation follow from this report, or what was the result of this report?

Mr. Cliffe: The report was mainly used in support of our cabinet submissions for the energy efficiency and diversity initiative, as it has now been called. The report is one of a series of studies we have undertaken. We looked at the jobs side. We looked at the productivity side. We looked at the basic economics. We looked at a variety of things. It was one of a number of components that went into the analysis supporting the decision to proceed with the efficiency and diversity initiative.

Mr. Brown: During the last while, we have had presentations from all types of groups before our committee, some advocating nuclear power, some advocating water power, some advocating coal technology and some natural gas. What that proves is that electricity is not an energy but just a transmitter of energy between places.

It has bothered me, as we have talked about demand-side management, that it is difficult to see how Ontario Hydro can manage demand in the vacuum of just looking at electrical energy and not looking at natural gas and the rest of that which the consumer power may be using. I was wondering what your thoughts were.

Should the federal ministry of energy within the province take more of a lead role than, say, Ontario Hydro, so that we get what we all want, the most efficient use of energy in the country, rather than having Ontario Hydro, for example, have conservation programs that may skew the market somewhat, forcing people to use natural gas when really electricity would be the energy of choice? I guess what I am saying is that it seems to make more sense to me to have an overall program trying to optimize our use of energy rather than looking at just a specific segment. I wonder what your thoughts are on that, or have I thoroughly confused you with my question?

Mr. Cliffe: No. I can give you my own personal views on that. I think what we are trying to do, and what I would see us trying to do, is to take a look at the whole provision of energy services, if you want to call them that. You do not demand energy; you demand your mobility, your lighting, your space conditioning. As Professor Berkowitz has indicated, you can look at it from a whole variety of perspectives, whether a specific utility, an entity looks after all three energy forms or other energy forms.

The main thing is that if you can have a price system in the market providing good signals to consumers so that they can weigh appropriate investment choices, then I think that is what we should all try to move towards. As to whether you can look at the question and say whether Ontario Hydro should be looking at the oil and gas side as well, I think that is a different type of question than you–

Mr. Brown: No, when I said oil and gas, I meant to generate electricity.

Mr. Cliffe: Generate electricity with oil and gas, yes. It depends where the cost-effectiveness lies.

Mr. Brown: My problem is that I think no one in this room, to be quite humorous, would suggest that we have a market economy for energy in this country. Obviously, no matter what form of energy we use, we have incentives, all sorts of things, taxes, etc., that change the way consumers will purchase energy. There are no true market forces other than the ones I think we as politicians create. It would seem that we as politicians, in the overall view, should be having a look at the demand side, but not just strictly at electricity. I do not think that makes sense.

Mr. Cliffe: I think you are quite correct on that.

Mr. Brown: Have you had a look at the DSPS and the numbers that Hydro suggests are the likely numbers for energy conservation? I do not remember the number, David. Is it 2,000 megawatts?

Mr. Argue: It depends on the time frame you are looking at. Whether you are in strategic conservation and interest-driven conservation.

Mr. Cliffe: We have had a look at the Ontario Hydro numbers. We had a look at our own numbers as well. I think in total we have estimated that there would be about 11,000 petajoules of energy available that would not realized in terms of price impacts on the conservation side. With given price forecasts between now and 2000, we would still be short of the conservation potential by about 11,000 petajoules. One petajoule is about–

Interjection: Eleven hundred.

Mr. Cliffe: Pardon me, 1,100. I slipped a decimal point there.

One petajoule is enough to heat about 10,000 Canadian homes. That is a significant potential that is being untapped. The bulk of that potential is within Ontario and I think about 40 per cent of that potential is electricity. I think we estimated that in Ontario there would be–was it 400 petajoules for the entire province? Nick is the numbers man here.

I think in comparison, we just did a quick comparison of the Ontario Hydro numbers and our numbers and they did not seem to be too terribly far off. The difference is, however, that I think the Ontario numbers are based on price increases as well and ours are exclusive of price increases. It was hard to make the comparison, but in essence I think the bottom line is that the Ontario Hydro numbers might be a bit low.

Mr. Brown: Just a bit? Not much?

Mr. Cliffe: I would have to go back and do some looking at that. I would have to get into some of the details of the forecasting Ontario Hydro did and see how that compared with some of the work that we have done on the potential side.

Mr. Pollock: I see on your chart here that you give heat pumps a fairly high rating. On the local level I see very few people going to heat pumps, or I know very few people even using them. Do you care to comment on that?

Mr. Cliffe: High rating. With respect to which chart are you referring?

Mr. Pollock: On this particular one right here. Energy conservation.

Mr. Cliffe: Cost-effectiveness.

Mr. Pollock: Cost-effectiveness.

Mr. Cliffe: Okay. You will see that there is a range in the cost-effectiveness there, from about 1.25 cents up to a little over about five cents a kilowatt-hour. That just reflects the differences in terms of the size and the costs of some of these systems and also the extent to which you provide a credit for air-conditioning elements to it. I think what we have seen, and reflective of your comment, is the fact that while that technology might be fairly attractive in terms of energy savings, it is still very slow to penetrate the market as you see. It has about three per cent of the market. It may be as high as five per cent and it is growing extremely slowly. I think your comment is correct. They are not being used a whole lot, but in spite of the fact they are not being used, they can displace electricity at a pretty reasonable cost. That is all we are saying.

Mr. Pollock: Okay. But heat pumps do not totally take over for electricity as far as capacity?

Mr. Cliffe: No.

Mr. Pollock: As far as heat is concerned, you still have to have some added heat besides that.

Mr. Cliffe: Yes.

Mr. Pollock: Okay, fine. Thank you.

Mr. Cliffe: Particularly in Ontario.

Mr. Pollock: Yes. Okay, fine.

Mr. Charlton: Just very briefly, Mr. Chairman. You have done some studies. You have your numbers man with you, but it is never the same as if we could have the data ourselves. As my colleague mentioned when she was asking a question earlier, we just heard continually, especially in terms of end use, "The data are not available," over and over again in so many cases. Gradually we have been starting to get some data, but there are still huge holes. Are your studies available to us? Can we get those studies?

1630

Mr. Cliffe: Yes, they are. We can send you studies on the penetration rates that we have undertaken, the job creation and the productivity.

Mr. Charlton: We would appreciate it.

Mr. McGuigan: I have one technical question about electric motors. You have mentioned that energy-efficient electric motors is one area where conservation could be carried out. Are you speaking of large motors used by industry or those used in household appliances?

Mr. Cliffe: We are looking at industrial and commercial applications for those motors, not residential.

Mr. McGuigan: Are you talking about the motor itself or the switchgear? I noticed you had variable speed.

Mr. Cliffe: We are talking about the motor itself in this one.

Mr. McGuigan: That means then that a lot of motors have been sold and installed in the last few years that were not energy-efficient.

Mr. Cliffe: That is correct.

Mr. McGuigan: I remember from a previous presentation–I think it was the last committee we had–they were telling us that the older motors, where they had asphalt materials for insulation, were quite efficient because they would not stand the heat rise. The asphalt would melt and the motor would short out, whereas more recent motors have plastic materials that will stand a larger heat rise and therefore can be made cheaper and are more inefficient. Do you have any idea of the mix of old motors versus new motors?

Mr. Cliffe: Offhand, I could not give you those kind of data, no.

Mr. McGuigan: It would be kind of interesting to look at that to see how many people are still using old motors, which I am told are more efficient. I suppose you could look at the name plate on them. It gives you the heat range. Does that tell you whether your motor is efficient or not?

Mr. Cliffe: I am not certain about that at all. That is one of the things we can perhaps check with some of the technical people.

Mr. McGuigan: I know there is a plate that tells you–

Mr. Cliffe: Yes, there is the nameplate, and then the Canadian Standards Association nameplate as well.

Mr. McGuigan: Is the barrier to putting these in the fact that people are in the business of producing a certain product–"widget," I guess, is the name we often use for nondescript products–and they figure that is their business, more than it is to be looking after whether or not they have the most energy-efficient motors in the place?

Is that not the barrier? There is nobody out there really selling to the users or coming along and pointing out to them, "You should replace that old motor." I have never had anybody call on me and tell me that I should replace my electric motors. I have had people call me and tell me I should replace my tractor, my combine or whatever, but no one ever called to tell me I should replace my electric motor.

Mr. Cliffe: I think you have hit on one of the areas that is in fact a barrier to the whole efficiency side of things; that is, despite the size of the industry in terms of its large numbers, they do not really know how to market their products. They do not know how to get out and, as you say, sort of beat the bushes to get some of the sales going.

It is a combination of getting them to have that marketing expertise and getting consumers out there to pull them along as well. That is a barrier. It is just the nature of the industry. It is large in terms of the numbers of firms, but the size of the average firm is small. They are sometimes just not capable of getting out and doing some of the marketing that they need to do. It needs to be sort of a push-and-pull process from both ends.

Mr. Pollock: Along that same line, though, what is an energy-efficient motor? Do they just step up the speed? Have they found technology to step up the speed?

Mr. Cliffe: It is a rating based on the energy end versus the horsepower end, but the physical workout as well. I do not want to get into some of the technical details, because I would probably mess them up as I did petajoules; but it is a rating based on the energy performance end versus the actual physical production of the workout. There are some studies that are better defined in some of the penetration rate work that we have done, and there is work done by Ontario Hydro as well on the efficient motor side which I think would probably be a much better source of information than I.

Mr. Pollock: Fine, thanks.

Mr. Chairman: Mr. Cliffe and Mr. Macaluso, I would like to thank you very much for coming in and presenting this and discussing the

question of labour impacts and efficiency with us this afternoon.

Mr. Cliffe: Thank you. It was our pleasure.

Mr. Chairman: Our next witness is also from the Department of Energy, Mines and Resources: William Peden, who is regional director of the Ontario conservation and renewable energy branch. We have had a paper passed out.

Mr. Peden: That is right. I have no slides.

Mr. Chairman: You have no slides, okay. We will have a low-tech presentation from Mr. Peden on energy efficiency in parallel and cogeneration.

Mr. Peden: Thank you very much for being here this afternoon and hearing our presentation. You suggested that I identify myself for Hansard, so I will do that. My name is William Peden. I am the director for the Ontario region of Energy, Mines and Resources. I should say that within the context of this hearing as well, I served six years as the vice-chairman of Toronto Hydro, the Toronto electric system, the Toronto Hydro commissioners.

My paper and my presentation are primarily geared to the utility sector, not to other types of fuels in this area. I have no intention of reading the paper, but I would like to go through it and highlight it for you and, hopefully, generate a dialogue afterwards. The paper is a summation of my views and those of Energy, Mines and Resources in terms of efficiency in parallel generation and cogeneration.

I guess you have heard a lot of presentations, facts, figures, slides, in this area over the past few weeks that you have been meeting. I hope that this paper somehow puts it within the context, provides some direction, at least from my point of view, in terms of which the Legislature might approach this type of subject, and we will see where we go from there.

One case in point, Mrs. Grier, is that you had asked about what the federal government was doing. With my presentation, I have tabled a news release and a backgrounder on energy research and development and energy efficiency and diversity. This was a $6-million program over five years. However, $350 million of that goes directly into supporting energy R and D, and $250 million goes into supporting energy efficiency and diversity, what we call the EED initiative, directly. There is somewhat more in there, but not as much as any of us would like, including our minister, I understand.

If I could sum up my presentation before getting into it, I think the gist of it is that small and medium-sized businesses, in quite a change in recent years, are the most dynamic innovators, the most efficient people in the country today. We are seeing this all across North America. The energy service companies, the cogeneration people, the private power and parallel generation people, may provide the greatest efficiency and innovation in the power industry that we see today, and we are seeing this in other sectors.

Depending on the actions that the Legislature may take, what this means is that you may find that your next Darlington, or your equivalent of the power that would be produced, may lie behind the customer's meter and with the innovation that these people would provide, and not in another large megaproject, generation type of facility.

I begin my presentation with talking about how we are so lucky to be in Ontario. Even though we are the largest energy-consuming province, we have a secure supply of electricity, we have access to western natural gas and oil and we have been able to fuel our economy and our lifestyle with this. We do find ourselves at a crossroads in terms of making a decision–I take it that is why the select committee is meeting–and electricity is becoming critical to our economic wellbeing, as you know.

1640

The Department of Energy, Mines and Resources intends to focus this presentation on the strategic value of parallel generation and efficiency improvements in providing a more diverse and cost-effective energy supply to help Ontario meet that demand.

Mr. McGuigan, as you pointed out earlier in the day, to some degree it is our wealth and our abundance of sources that have hampered us from the overall integration of supply diversity and improved efficiency into the energy mix. We have almost been hampered by our wealth. In fact, the International Energy Agency points out that Canada as a country and Ontario as part of that lags substantially behind its trading partners in overall energy efficiency.

That factor could prove of some significance as we go into what may be a free trade era and particularly into a more global market in which we are competing around the world, because the factor of efficiency is of some significance if you look at the energy efficiency gap in terms of how it might impede our competitiveness in international markets. I use some examples of that in that Canada and the US spend approximately 12 per cent of their gross national product on energy. In terms of its manufacturing processes

and its services, Japan spends approximately five per cent of its gross national product. That gives it an efficiency and productivity factor of about seven per cent, if you wonder why the Japanese yen may be stronger.

The interesting thing is that, while our conventional generation supplies and energy industries are fairly mature–the costs are known, the economies of scale are known–the energy efficiency side, the cogeneration, has yet to mature. This brings me back to my original point, that the innovation exists there, the gap exists there. In fact, some of my examples will show that we are still bringing forward, almost on a yearly basis, doubling the efficiencies and the productivity in this area as opposed to the more conventional areas.

We have seen a recent retreat from energy efficiency investments in Canada, which leads us to believe that until another crisis comes along–and we may be sitting here again 10 years from now asking, "Why didn't we do it back then when we had the chance?"–we may not face this issue. While I do not dismiss the value of conventional supply, I do believe that our focus must change at this particular juncture in our history, while we have this time.

I would like to move into talking about some of the particular areas, especially energy efficiency as opposed to parallel generation or cogeneration right now, and what it represents.

Lighting, which is where I am going to concentrate first, represents about 35 per cent of Ontario's total industrial and commercial building electricity consumption. That is an area where we can make some great inroads. I know you have had some presentation on lighting and efficiencies here. To use some examples, if the advanced techniques that are available today were to be fully applied to our energy sector, to our lighting systems, a saving of more than 80 per cent of all present lighting energy could be realized without altering the level of illumination.

We had a lighting study done in 1986 at EMR which indicated that important energy savings were extremely cost-effective, reliable technology but the market penetration was dismal, as I take it you are hearing over and over. Replacing incandescent lights with compact fluorescent lights–a proven technology–provides lighting for 10 times as long and cuts heat production by up to 80 per cent. You will find, as I found as the Toronto Hydro commissioner, that most of the energy in our downtown buildings in the middle of January is going for air-conditioning. I could not believe it, in the middle of our winter, but in fact that is true: to air-condition buildings from lighting, appliances and body heat.

Even those efficiency technologies that were very cost-effective showed only about a 15 per cent share of the market, leaving 85 per cent penetration. I have some bad news for you. We were wrong on that. Most of these technologies talked about the replacement of incandescent lighting or more inefficient fluorescent lighting by using 34-watt compact fluorescent bulbs. There are now products on the market, flooding the US at the present time, that are 18-watt, that provide a larger blue colour spectrum, so the lighting illumination is better and we can actually have the figures we were talking about a year later. This is what I mean in terms of the product: the state of the art in this area seems to be advancing very rapidly.

One can ask, with this kind of cost saving, why it has not penetrated. It is hard to say. Part of it, I think, is the incentives used in terms of the utilities, either the local municipal utility talking with the business and installing its lighting, or Ontario Hydro or the contractor being aware of the technology, being interested in replacing it. Obviously, there are economic barriers in terms of who pays the capital cost versus who is actually paying the heat, the light and the water.

I think particularly utility incentives, if you actually want to avoid large-scale generation, may go some way in terms in penetrating that market and allowing situations which are beginning to open up here in Canada and especially Ontario for energy services companies to come in and utilize third-party financing or energy-savings financing to be able to capture those savings gains for themselves. They then have an incentive to go in, replace these bulbs and take the savings away. In some way, we have to remove or knock down the barriers that may hinder those people.

However, I am going to leave lighting here. A similar situation exists for appliances and space heating and cooling systems. Mr. McGuigan, you were talking about the motors in appliances, the smaller motors. Those are mostly covered by appliance efficiency and appliance efficiency acts. The ones we are talking about in terms of energy-efficient motors are the larger ones. With the little ones in your refrigerator and your washing machine, you should be able to read in terms of whether you buy a 112-kilowatt-hour refrigerator versus 160: it is going to cost you a lot more. That is where you would see that kind of–

Mr. McGuigan: That is only fairly recently, is it not?

Mr. Peden: No, it has been out for some time in terms of the sticker being–the last time I bought a refrigerator, I looked at it very hard. The interesting thing is that one of the least efficient refrigerators in the United States is our most efficient. In other words, where they start in terms of efficiency is where we end, in that sense.

I do not know what free trade will do to that, but I think we had better move fairly quickly or we will be in a situation like we were with oil, in which the Japanese responded to the price of oil at the world price. We protected ourselves against it and wound up almost losing an auto industry, because they responded to the proper price mechanisms and developed an auto which the consumer wanted.

Anyway, in Ontario you have moved for an energy efficiency act, and I believe it will soon specify energy efficiency ratings for household appliances. I think that is certainly an initial step in the right direction.

In terms of buildings, and this has been mentioned here for R-2000, Energy, Mines and Resources has certainly focused over the last few years a great deal of effort in terms of the R-2000 and building efficiency standards for new housing, not only to indicate clearly the energy efficiency achievable in the residential sector but also the advantages efficiency can have in other aspects of their lives.

I must say we are presently moving to work together with Ontario Hydro on energy-efficient building, R-2000; in fact, EMR and Ontario Hydro have worked co-operatively to test and refine what we call an Advanced House with a targeted energy consumption of 50 per cent lower than an R-2000 level. You have heard about variable speed drives and energy-efficient motors. That also comes into the efficiency sector.

I think the importance of electricity conservation–and here, when we talk about efficiency, we mean demand-side management–and efficiency measures is highlighted by the fact that Ontario Hydro's own overall demand management strategy indicates that it hopes to provide around the equivalent of a 25 per cent reduction in current peak electricity growth by the year 2000.

I think the numbers were that demand-side technologies were going to cut the present peak by about 25 per cent, but then we were going to be growing, so they have shown that they understand that is a possibility. I think, of course, this is severely underestimated. It will depend upon the rigour which you as a Legislature may set up for them to do and also with which they pursue these programs.

Just to point this out, their first step is quite noteworthy. Other jurisdictions that have placed a higher premium on electricity efficiency and sometimes had real problems to deal with, particularly in the early and mid-1980s, have shown some quite significant gains. I cite Southern California Edison here, which achieved an eight to 8.6 per cent yearly decline in peak demand–not in peak growth but peak decline–at a cost of around US 1 cent per kilowatt-hour during the mid-1980s.

1650

They did this because a lot of their generation was oil and natural gas and they had some real problems supplying that. They did this not with a massive lighting retrofit program, which they started to install later, but by appliance efficiency and putting on standards when new buildings and new appliances were going on, by building efficiency standards, which they would work out with their commercial-industrial customers, and by setting up what they called a sliding scale incentive program on hookup. That meant they were so concerned about peak that when a new building was being built or new facilities were being upgraded, they would work with the building and set a particular efficiency standard.

If this building would not spend the capital to achieve that standard, then they were penalized by Southern California Edison, and it cost them more to hook up because it was going to pay for the generation that they would have to undertake to supply that. If they came under the standard, they would receive a rebate and they were able to achieve rather significant savings fairly rapidly for a short period of time.

What I see, as I said, in terms of efficiency is the compelling need in Ontario for action. Ontario must meet the challenges by putting forward an energy demand growth with a strong push to ensure that efficiency becomes an integral part of industrial, commercial, institutional and residential energy use. I think that strong incentives will be needed to ensure that the potential of the available opportunities are realized quickly and fully.

I would like to move on to private power generation, which is parallel and cogeneration. I think that increasingly–and you have heard a lot of that testimony here–private or parallel generation, that is, power generated by nonutility sources connected to the grid, is seen as an

important avenue for addressing the need for additional capacity in an environmentally sound way. It improves the efficiency of our fuel uses; it exploits the full business potential of new technologies. As I say, small and medium-size firms are often the most innovative these days.

Ontario has recently become more progressive in its policy towards private power production. In what it proposes, Ontario Hydro could provide a model for other jurisdictions to follow. However, I emphasize again, and I will talk about this a little later in my presentation, that we need to translate these proposals, the rhetoric, into sustained action.

I would like to mention that the BC Hydro and Power Authority has, strangely enough, emerged from a cocoon and become very open to both demand-side technologies and parallel and cogeneration. I recently spent some time with the manager of that group and he indicated there were two reasons for this.

One was that there was a change of chairmen in British Columbia and the chairman came from a nonutility background. He basically looked at everything. He looked at the demand side and the private sector generation and thought that made sense–the best bang for the buck–and that they should pursue that; he had no sort of axes to grind.

The second thing, and this gentleman indicated it may have been the more important, was that BC Hydro and Power Authority had gone through quite a downsizing over a period of about five years. It had very little of its present generation cadre there, so there was no vested interest. They were looking, more or less objectively, at how they were going to supply their generation or their need for capacity. Demand-side management, cogeneration and parallel generation made the most sense for them economically, and they are pursuing it quite vigorously. That is a rather recent turn. You might have had or want to have some of those people talk to you.

Parallel generation is of particular interest to the Department of Energy, Mines and Resources because we spend a lot of money developing it, particularly in the alternative electrical generation technologies, in biomass and small-scale hydro.

Today in Canada, private power production across the country accounts for about eight per cent of our total electrical needs, whereas in Ontario, I think we have about five per cent of the total electrical generation capacity, about 1,200 megawatts, done from private power generation.

Of the technologies available, small hydraulic and cogeneration are the two that immediately appeal to us to add capacity to Ontario Hydro's energy picture. We see about 570 megawatts presently on the line from small hydro. Our studies have indicated that the fairly immediate potential for installations of less than 20 megawatts would be about 700 megawatts more. There is at least double what we presently have on the line in terms of small hydro.

In terms of cogeneration, this is where I see a real possibility for a breakthrough; I think you have had some presentations on this. Presently, 41 per cent or some 450 megawatts of Ontario's private power production is produced by cogeneration. The potential is for considerably more.

Using a Ministry of Energy 1987 study, it is estimated that at least three times the present cogeneration, almost 1,350 megawatts, could be easily and economically implemented at today's rates by the year 2000. I think it is also important to note that this same study identified almost 10,000 megawatts of cogeneration across Ontario that could be implemented if the economics and the feasibility were fine.

The kinds of things I see in terms of cogeneration being technically and economically feasible is that it can offer significant benefits not only to independent power producers but also offers it to the utility in terms of not having to go for higher-priced generation. It also provides regional prosperity and system diversity in some cases.

I use a couple of examples. We–and this is the ministries of energy provincially and federally–helped develop a 10-megawatt wood-waste-generated plant in Cochrane called the Northland Power generation project. It was solving an environmental problem. It provided, as I said, 10 megawatts of power up there. It provided jobs and money in the local economy. They were so pleased with it up there that Northland Power decided it was also going to add 30 megawatts of gas cogeneration to sell back to Ontario Hydro lines and make money from it. It is interesting. Combine those, and 40 megawatts is the supply needed to supply the area between Kapuskasing and Kirkland Lake, which has always been a troublesome area for Ontario Hydro because of transmission lines and heavy winter situations up there. It is basically a backup if not a full supplier for that rather large area in the mining sector in northern Ontario.

Another area in northern Ontario where we were involved, both the provincial ministry and ourselves, and of course Ontario Hydro in

accepting this line, was in Chapleau where we helped fund and build a 7.5-megawatt wood-fired cogeneration plant, which again increased energy efficiency and reduced waste and pollution, but more important, provided 15 full-time jobs that stay in Chapleau and more than $250,000 worth of income per annum that flows within the community–important to a small community like that–from this installation.

One of the major benefits–and this is in response to a question you asked earlier, Mr. McGuigan–in industrial application is that a cogeneration plant really reduces the amount of unproductive energy and it can increase the overall efficiency of the energy used in industrial processes by up to 85 per cent. Your point was, why should we burn natural gas, which is a finite source, if we can burn electricity?

One answer to that is that the petrochemical industry in Sarnia may be burning natural gas as part of its industrial process, anyway. Those facilities are usually around 40 per cent to 50 per cent efficient; the rest of it is often pushed out in waste heat. If you upgrade that to an electrical generation, you are supplying diversity on the system and you are supplying electricity. You are then using the waste heat, which is one step down from that, for the heating process. You are actually increasing your efficiency and not burning that much more of the finite resource, which you have pointed out. That is certainly one benefit of cogeneration.

1700

Utility benefits also seem to be clear to me. Cogeneration and other forms of parallel generation reduce or defer public capital expenditures for new generating capacity, allow for increased resource planning, help to improve efficiency of transmission line use, help to diversify the supply and add to system reliability.

There is one thing I wanted to bring out in my paper, and I am just going to mention it briefly and point out some examples. We have heard mostly about the large industrial potential for cogeneration. There is also a potential that is just now growing in the small-capacity cogeneration, mainly for commercial and institutional building. It is only beginning to penetrate the market. This is sort of exciting. These plants are essentially prebuilt and require very little in the way of onsite construction. This type of facility can not only reduce overall plant cost but improves quality control. There are about 300 of these smaller plants in operation across the US at this time.

We are now just pioneering some in this area here. One that comes to mind is TESS-60, which is a 60-kilowatt generation system recently introduced by IES Canada. This system is for commercial and residential application. It is fuelled by natural gas. It produces electricity, hot water, heating and air-conditioning simultaneously. The projected payback for this installation is about four years.

Lutherwood, which is a health care facility for the mentally handicapped in Waterloo, is also going to be the site of a demonstration for what we call a microcogeneration plant in Ontario–15 kilowatts. It is intended to provide all of the heat needed for the therapeutic pool and for a portion of the domestic hot water requirement. We are looking at a site in Leamington, a 400-kilowatt reciprocating engine which is being installed in a local greenhouse operation.

These smaller cogeneration sites are just now being innovated into our economy.

I would like to bring this whole discussion of parallel and cogeneration into context. I would like to use the example of PURPA in the United States. You know what PURPA is: the Public Utility Regulatory Policies Act passed in the late 1970s in response to the crisis. It is somewhat of a bad example because there were a lot of pros and cons about PURPA and a lot of very strong advocates on both sides.

Basically, PURPA did one thing. It made the environment crunchy, black and white. On the one hand, utilities were muddling through and going on much as you find in Ontario right now. After PURPA, that was no longer the case. The law said: "Before, you were doing this, you were paying that. Now you are doing this and you are paying that. You guys go figure it out." It made it very clear in terms of black and white.

If there is anything I would urge this committee to take back to the Legislature on the whole, it is that you need to do that. You need to set something legislatively that makes it very clear to the players in the game, to small businesses, to medium businesses, the energy service company, to the utility, that this is the particular game we are in. You can then ask how you are going to answer the hard questions about who determines the buyback rate and who determines how this is implemented.

My second suggestion would be that you move more towards an Ontario energy commission, that you move towards a situation where these things can be rationally considered and bring the technical experts forward, if you will, to argue it

out before an independent and objective body that has some teeth.

I can only refer back to Bob Macaulay, who sat as the chairman of the Ontario Energy Board. He suggested that we either do away with the $2.5-million yearly exercise of looking at Hydro and Hydro's rates, which actually did nothing to move anything along, or give the board or commission, whatever you might call it, some teeth and let it actually do its job.

As I say, the one thing PURPA did was put the whole energy business into a context. It removed the utility barriers to private power generation, provided a strong stimulus to independent power production and spurred the development of vigorous and financially independent industries.

I can only point out that in the United States in 1986 the generation that was installed that was private power, parallel and cogeneration, for the first time exceeded the amount of capacity that was provided by conventional utility generation. It is quite a vigorous industry in that sense. I do understand that they are now being looked at. PURPA is being re-evaluated. I will be interested to see what they come out with.

The barrier that I see to a greater penetration of parallel and cogeneration would be, as you have heard before, obviously, the payback. I have down here that most industries generally require more than a two- to three-year payback for capital investment. My colleagues in the Department of Energy, Mines and Resources tell me that is closer to a one-and-a-half-year payback, which really knocks out a lot that could be done in this area.

This makes sense to the particular industry on the life-cycle costing analysis. It definitely makes sense to the utility and to the public from the utility generation side, but often it does not make sense to the chief financial officer in terms of where he is going to spend his money. Obviously, incentives set up by Ontario Hydro that would allow energy services companies in could go a long way in terms of helping this.

Often, as well, the industries that could participate in this take a look at the environment and say: "The utility we have to deal with isn't that happy about this. Let's not get into this game." In other words, they want to be in a good environment. They want to work with people who actually want to do that, and I think that would go a long way towards breaking down some of these barriers.

Obviously, the other reason these private power projects are sometimes deemed uneconomic is that they are in direct competition with the blended average energy rate, which does n reflect the full realistic cost required to produc the energy by public utility facilities built today

I am not going to give you an actual answer i terms of what the rates would be. In my feeling the blended average rates currently used as th basis for power purchase should be recalculate Private power producers should be paid at a ra per kilowatt-hour closer to the incremental or th marginal cost of new or planned generatin capacity. That would go a long way towar opening this up.

I guess my summing up would say that t achieve the strategic potential of private powe production and ensure that the marketplace i given the opportunity to fully assess and tak advantage of the potential for investment, yo need a level playing field. You have heard a l about that before.

In Ontario, it is my feeling that you need t act to remove the regulatory and institution barriers that restrict the province's private powe producers, the demand-side management, ver much in the same way that PURPA freed the wa and provided a context in the United States.

We are fortunate to have what we have today. believe we have seen a rather broad agreement i that aggressive measures to tap efficiency an alternative sources would help Ontario meet it energy growth requirements.

You have heard something about the time. can only reiterate that. It does take time to brin about the change in what energy we use and ho we use it, making efficiency a highly importan element. Seriously tapping the least-cost mega watts of alternative energy sources will no happen overnight, and it does not happen fo free. It is a choice between putting money i investment in one place and really putting i effort in one way as opposed to the other way The time needed cannot be overestimated.

However, the reaction time and the flexibilit of these types of technologies are often muc quicker. It takes you 10 or 11 years to get nuclear station through regulatory bodies. Her you can do something in cogeneration, smal power generation or efficiency within two years if you put the effort into it. You gain mor flexibility.

I wish you well in your deliberations. I ca only remind you that 75 years ago Sir Adam Beck, who is seen as the founder of Ontari Hydro, had the foresight and the conviction t stand up and fight to ensure that Ontario' electrical resources would be in the hands of th people. Only by running a utility as a publi

utility could our energy resources be fully used to advance our industrial strength and quality of life. History has proven Adam Beck and his successors right.

1710

Throughout the postwar period, the economics of electricity demand and the availability of abundant natural resources also favoured the development of large-scale public power systems in Canada, primarily thermal systems. But today we are in a different time. It now costs us significantly more economically and environmentally to continue that trend. In Ontario, you have the opportunity to harness the energy from increased efficiency and private power production to add more flexibility and diversity to your energy mix. Seizing that opportunity and making it a reality is the next energy challenge Ontario faces.

Mr. Chairman: Thank you. We have a few minutes for questions.

Mr. Pollock: I would like to know how you would resolve this situation. I have a large lake in my riding. Last year, they kept taking out the logs and letting water down to generate power. This year, they did not, and the ducks practically had to learn how to walk because the water stayed in the lake. The cottagers wanted that water to stay in the lake. How would you resolve that situation?

Mr. Peden: I do not know. Where is the lake?

Mr. Pollock: We can get into details. It is Baptiste Lake.

Mr. Peden: It was a question between the cottagers wanting to–

Mr. Pollock: The cottagers won out this year. I do not know who is going to win next year, but last year the cottagers did not win. The lake went down quite a level. That has been one of the situations that has arisen since we started generating more electricity with water. Sure, I am all for it in one way, but in the summertime it is just a no-no to the cottagers.

Mr. Peden: Better water management, I guess. I do not have an answer for that. You are always going to have problems. Maybe you will use the lake the first half and not the second half.

Mr. Pollock: You can generate it in the spring, all right enough, but once that is over with, it is game over for a while.

Mrs. Grier: Mr. Peden, that was an interesting presentation. I am very sympathetic to your point of view that there is more potential for cogeneration than we have perhaps heard, and the need for some kind of a regulatory framework to encourage it. My problem is that everybody seems to be into the act. You have given us examples of cogeneration–Luther Wood and other examples. We have heard some examples from Ontario Hydro of cogeneration pilot projects it is into and the Ministry of Energy is into it.

Where does the responsibility lie? Are you all co-operating on the same projects and everybody is taking credit for them, or is there in fact a lot of confusion as to who has the primary role?

Mr. Peden: You, the Legislature, have the primary role at this point in time. Energy, and certainly Hydro, are provincial jurisdictions. We, the Department of Energy, Mines and Resources and the federal government, have been involved in certain projects under which I have listed other projects, and we have been involved with them through a triumvirate. We have worked with Ontario Hydro, we have worked with the Ministry of Energy in terms of demonstration, research and development in this area, and we have done quite a bit of that.

I think essentially what I am saying is, yes, we do have those examples, we do have those projects, we know what works out there and one of the key things is to get crunching. Now you just have to get beyond the few examples and demonstrations and implement it–implement Cochrane over and over again, implement Black River hydro over and over, implement the energy-from-waste plant in 3M over and over again where it seems feasible and where it meets the economic and environmental criteria.

Mrs. Grier: What is the federal role?

Mr. Peden: Federally, we cannot get involved with your provincial jurisdiction in terms of, if you will, how you are going to instruct your provincial utility or how you use your energy resources. The federal role continues to be demonstration, research and development, leveraging and working with remote communities in jurisdictions where we have to continue to provide the information.

When I suggest to you that it is time to make it very clear, we have been at this a very long time, as you know. If the amounts of money and time that have been spent–I probably should not say this–on select committees had been put into really making a strong start in the lighting area and in some of the cogeneration areas, we might be a little more down the way in having the substantive evidence and validity in terms of where we are going.

Hydro seems to be saying the same thing at this time, as well: "This is where we're going to go." What I am suggesting is let's just encourage that and be crunchy about it.

Mrs. Grier: I guess my concern arose partially from the press release you gave us about the amount of federal money going into it and your comment that we needed more. If it is so self-evident that these demonstration projects work and that this is the route to go, why are you doing more research and development and not putting up some incentives to encourage other people into it?

Mr. Peden: Given the discussion between Michael Wilson and Marcel Masse, this was the level we were allocated at this time. Part of that is that a lot has been done. Energy, Mines and Resources has put in a lot of money, particularly in the efficiencies and renewables area over the last 10 years. They feel that part of that now is to get it out, use what we have right now which is sitting on the shelves and move to get it out before we spend a lot more money in terms of more research and development. It is also just the tradeoffs, the way it went.

I can agree with you in the sense that you had money voted for Hibernia, a particular situation; money voted for Lloydminster, the Husky Oil upgrader situation. Perhaps you as Ontario should be standing up and saying: "There is a megaproject's worth of energy efficiency and demand-side management and cogeneration here. Federal government, you should be putting some of your money here."

Nobody has really asked them for that. Hibernia was asked for. Lloydminster was asked for. We have not yet seen the Ontario government stand up and ask for a megaproject in efficiency and cogeneration and for the federal government to participate in that.

Mrs. Grier: We have only 49 more days left, though.

Mr. Peden: Ask for it. It is a good time. It is true, but those 49 days are very important. I think what I am saying is you really have not asked for it.

Mr. McGuigan: I just want to doublecheck one of the statements you made; I may have misunderstood. I thought you said that 80 per cent of the power in wintertime in downtown high-rise buildings was for air-conditioning. Is that correct?

Mr. Peden: No. I think what I said was that we could reduce a lot of our power by lighting. If we applied all the efficiency improvements, we could reduce the lighting by almost 80 per cent–that is obviously not realistic, but that is a target we have–and if we were to install compact fluorescent lights, that actually cuts the heat production by 80 per cent in terms of the present incandescent lighting we have there.

What I suggested to you–I do not know the exact figure, but I was quite surprised when I heard it–was that a lot of the energy that goes into our downtown office buildings–I would suggest at least 50 per cent and it may be more–in the middle of the winter is actually to air-condition the heat out of the building. That is not true in the Ontario Hydro building or some of the other buildings that have been recently installed where in fact they have a heat sink that collects the energy.

Ontario Hydro should be pressing and should be setting, as Southern California Edison and San Diego Gas and Electric Co. did, an energy-efficiency standard and saying: "If you go above that, because we know you can do that–we did; we put in the heat sink–then you're going to cause the whole consumer base to pay more for the generation because you didn't think efficiently and it was available. Therefore, you need to pay a little higher cost in terms of a hookup charge." If the building goes better than that, and says, "Not only did we do this, we've also instituted these 18-watt fluorescent lights, etc." and it gets under that standard, then it gets a break. In other words, people should be rewarded for the way they efficiently use their energy. I think that is the key. Right now we do not reward people for efficiently using energy. It is a damned shame and that is part of our problem.

Mr. McGuigan: I got enthused about putting those fluorescent bulbs in my house, so I bought one from a supplier in Chatham. I had to try several before I found one that worked. I took it home and tried it and it did not work. I took it back and got three more, I think, before I got one that worked. I got one that did work temporarily. I hooked it up in my basement because I could not find any other place to put it. It went for about three weeks and went out.

1720

In addition to those problems, when I tried to fit it to the lamps around the house, I could not put it in one single lamp because it was too long. You know there is an arch on your lamp that holds the shade; well, there was no room between the base and the top of the arch. I would have had to replace the whole unit, every lamp in the house, before I could have used it.

Are they all as bad as the one I got hold of?

Mr. Peden: I think the example you bring out is perfectly fitting for what we are talking about. I came back just last week from a discussion on a number of these types of technologies and saw from that end to where this gentleman is sitting over there filled with the new energy-efficient lights for all kinds of uses: exit signs, home lamps and industrial uses. That kind of stuff exists. You cannot find it; you usually run up against a problem and it turns you off the whole situation.

That is one of the problems we have; you are right. They do have those kinds of things that would suit you perfectly well but you are unable to find it in your stores and it is not available here. What is the problem with the market that is hindering that? I am not exactly sure.

Mr. McGuigan: I do notice in the apartment building I have here in Toronto that in the hallways they all have those efficient lamps. I also notice they have a lock on each one of them. They are worth about $20 apiece.

Mr. Peden: I could tell you tales of listening to some energy service companies. They are motivated, of course, to create savings because that is how they make money. That is what I would like to see a lot more of, because they really have the motivation: the more they save the more they make, if we set it up that way. They have brought up that same problem, that one of the biggest problems they have is that these things become so popular they develop legs and walk away.

Mr. McGuigan: They are $18 to $20 apiece.

Mr. Peden: That is right. They almost have to put someone onsite for the first month just to guard them.

Mr. McGuigan: They have them all locked, with a little padlock on the enclosures. I am not revealing that I was contemplating taking one or anything like that. It was just my interest in it that made me notice that.

On parallel cogeneration, and you gave the experience in the United States, I am wondering if they slant the field towards gas. Gas was the area where it is easiest to get into parallel and cogeneration.

Mr. Peden: Certainly cogeneration. That is true.

Mr. McGuigan: They did slant the field towards gas.

Mr. Peden: They did not slant the field but that has obviously been the lion's share. First, that is what many or most industrial processes were using. There was some coal. We do not encourage coal any more because of what happens to our lakes, as you know. If we are looking at cogeneration, we are looking at wood waste which, by the way, is not carbon-producing, I was glad to hear. I kept thinking that all the wood projects we are running now, because of the greenhouse effect, we have to be very scared about; not only do we not want to add coal, we do not want to add wood. But you do not have a carbon problem with that; you have a NO_x problem and a particulate problem. Wood waste and gas-fired cogeneration probably are the most immediate implementable cogeneration technologies right now.

Mr. McGuigan: It does not create carbon dioxide?

Mr. Peden: Not to the extent that fossil fuels do.

Mr. McGuigan: I was interested, also, in what is on page 8: "Private cogeneration projects in the industrial sector cannot compete with other projects for capital investment dollars when a payback period of less than three years is required." I wonder why industry looks at less than three years as not being profitable. That is $33\frac{1}{3}$ per cent a year. They look for a net of about 14 to 15 per cent on their total investment. They also have fast write-offs in many cases against this. Is there any reason they will not consider anything under three years?

Mr. Peden: No. I guess if they put in a new product line, they will be making that money back within a couple of years by the new product line that has come in, and then they see that as their standard by which they set up an investment. But there is obviously much more behind this. First of all, this is not the business that these people are in.

That is another problem. They are not sure that the environment is friendly out there, that Ontario Hydro really wants to pursue this. There have been fewer incentives recently in this whole area for writing off capital expenditures in energy.

Those are the major barriers. I think it is the fact that it is not the business they are in that makes them hesitant as well, whereas producing widgets or cans, etc., they are familiar with.

There have been some success stories. I recently met with a fellow who makes wire in Illinois or Georgia. His head plant was in Georgia. He was in desperate trouble in the early 1980s and in danger of going under. This is a pretty mature industry making wire and, in fact, they saved the jobs and the company by going very heavily into efficiency improvements in

energy. By reducing their energy bill, they were able to get the margin they needed to stay in business and to do quite well. In fact, one of the things they did was to buy an old diesel plant from Manitoba Hydro. It works really well for them, and they asked Manitoba Hydro why it had sold it to them. It was a really good plant, and why did Manitoba not use it? Manitoba said, "We have written it off; therefore, it is time for us to get rid of it."

That is a success story on that side, but those are few and far between. Those types of industries would benefit directly, of course, from saving their energy when they are on that kind of margin.

Mrs. Sullivan: One of the things we have heard quite consistently over a period of time is that a major part of the problem in introducing conservation relates to the time, the product development stage and the marketing stage; who is going to handle delivery and what kind of incentive should be designed. I wonder if Energy, Mines and Resources has looked into any of those areas.

Mr. Peden: We have looked into them. We do not have much ability to influence that in a provincial jurisdiction. I am not exactly sure I understand the nature of the question.

Mrs. Sullivan: I wonder if you have done any research work or documentation relating to any one of those areas, including product development and the stages of taking an efficiency product or a conservation technology from invention to commercial feasibility. Are you doing anything at all in that area? Once you are past your demonstration project, is it there for others to pick up?

Mr. Peden: In actual fact, Mrs. Sullivan, that was the basis of the involvement, and quite heavy involvement financially over the last few years–less so now–in which we undertook it. We had worked with consulting firms and looked at development scales. You knew that your greatest amount of money and resources was going to be needed at the front end in research and development and prototyping. Then you reached a certain level of commercialization and you had to follow it through. You could not drop it at that particular point. R-2000 is an excellent example.

Then you went in and you worked with the associations, the trades, with particular people who had a vested interest in that. Then you would get out into the demonstration side of it, where it was physically demonstrated. You would get into the information and technology transfer side. It is very important to be involved in that side so that you are providing, if you will, objective background and evidence that this is a feasible product or a feasible type of plant and things like that. After that, you pretty much get out. There comes a point in time where you want to reap the harvest.

That type of scenario is, in fact, the basis upon which we got into these developments. Whether I am answering your question or not at all, many of these technologies have come to a certain amount of maturity in the marketplace and there is less money that we are putting in now. I think there are second and third stages there, but it is now being looked at that the actual energy industries involved should be the ones that are getting involved.

1730

Use British Columbia as an example. From a governmental point of view, to the best of my understanding, British Columbia has said: "We, as BC, are getting out of this direct business. We want you to deal with British Columbia Hydro. These are the people handling it." Interestingly enough, they are also the ones who seem to be at the forefront in terms of demand-side management and parallel private power generation at this point in time.

Mrs. Sullivan: So then you have had several models or examples of the taking up of a product or a technology to the point where it is commercially viable and ready to be marketed?

Mr. Peden: I can provide that for you if you wish.

Mrs. Sullivan: What are your observations about the time lines?

Mr. Peden: They vary depending on the technology and they vary depending upon the push and the crunch; in other words, on how much incentive is pushed behind it. R-2000 is a case in point. It has taken a long time. It continues to take that to get that technology into the trades, partly because you are dealing with an entire generation of tradespeople who have done it one way. It is hard for them to shift the other way.

You are almost doing this incrementally. Slowly by slowly, each work gang that comes on has a little more information and a little more insight. I remember the first R-2000 or super-energy-efficient homes that were being built. The builder, the contractor, was so frustrated that he would come back saying, "I showed them, I showed them, I showed them." Then he would go back and would find holes in the vapour

rrier. They would say, "It's just a few holes, a il hole here."

Of course, any holes in the vapour barrier mpletely destroyed the technology that we ere building. It was the key film that was there. was hard for the workmen to fully understand at. Part of it is an entire generation. It is getting into the schools.

Other technologies such as the efficiency chnologies–the lighting, the appliances and at–I think will take incentives in terms of formation as well as incentives to provide it for e utility for it to be implemented. "Oh, you ean it really is a good deal for me to install these -watt compact fluorescents, even though I ive to bring the guy in to change them right now cause you will give me X amount off my bill or t charge me for more?" That type of thing.

Mrs. Sullivan: That leads me to my next estion. Has the Department of Energy, Mines d Resources done any work on the design and e delivery of incentives?

Mr. Peden: Have we? We have lost our major perts there. I cannot answer that. We may ive, but it is not something that immediately mps to mind.

Mr. Chairman: Mr. Brown, do you have a ort question?

Mr. Brown: Yes, I do.

Mr. Chairman: I was just noticing the clock I made that comment; that is all.

Mr. Brown: One of the things that occurred to e was that with cogeneration in particular the estion seems always to revolve strictly around hat the appropriate buyout rate is. At a certain iyout rate, you are going to get a lot; at a lesser te, you are going to get less, obviously.

Maybe it depends on the particular jurisdic-on, such as Ontario. The buyout rate in this ovince generally may be lower than it might be the American states for a variety of reasons. as there ever been any thought about selling this wer somewhere else? For example, Ontario ydro could act as an agent to sell this power to other jurisdiction. I realize each project would relatively small, but it would seem to me to be way to make Ontario efficient and competitive, d to do a lot of good things that way if that wer is in fact a good private industry. It could a great export for us.

Mr. Peden: All I can say is that you are aling with a monopoly. You cannot sell power, matter how much you generate. I should not ake that the complete answer, but to the best of y knowledge, by act you cannot sell power, and you certainly cannot transmit it in this province except through Ontario Hydro. Therefore, the buyback rate Hydro offers is the one you are going to get. You could not make it, for instance, in Kapuskasing or Cochrane, where they want to make it, and sell it to your people who need it down in the Muskokas or some place.

Mr. Brown: What I am suggesting here, just for argument's sake, is that you might have 10 megawatts of power that you can get at a certain price. For example, New York state might be pleased to buy at that price. Ontario Hydro could make an agent's fee distributing it to New York state. Do you see that as a viable possibility?

Mr. Peden: Let's use the example of 40 megawatts which is a nice little size. Northland Power would actually like to sell that to a buddy down in the Adirondacks, and Ontario Hydro would simply be the conduit and charge a certain tariff for going through. It is feasible, but it does not seem likely. You are dealing in rather small increments and you are having to go across international lines.

Mr. Brown: I was thinking more that Ontario Hydro would negotiate with New York state or whoever for a given amount of power at a given price, see who wants to provide it at that price and go to it.

Mr. Peden: I see what you mean. It is an interesting concept. New York state is willing to pay, say, 12 cents a kilowatt-hour for power, as they are in some jurisdictions. It would seem to me that Ontario Hydro would want to sell its own. What you are saying is that Ontario Hydro could act as the broker for private power cogeneration.

Mr. Brown: I am just wondering what you might think of that proposal, because it seems to me that certain proposals at Ontario Hydro's buyback rates would not be possible. It may make sense to our utility to act as a broker and to get some cash transmitting the power.

Mr. Peden: It may make sense. It does not seem very feasible to me.

Mr. Brown: Was I brief enough?

Mr. Chairman: Fairly brief, Mr. Brown; thank you.

Seeing no further questions, Mr. Peden, I would like to thank you for coming in and speaking with us and for preparing the paper.

For the benefit of the committee, our first witness tomorrow is Dow Chemical. Their presentation has been handed out previously. The clerk tells me it is 52, which may seem

something to you. It has a grey cover on it. That may mean more.

We have also handed out a summary of points, I guess, for discussion during the sessions that we will be having with Hydro over the next couple of days. Mr. Richmond, do you have any comments you want to make on that?

Mr. Richmond: All I want to say is that we have a mountain of paper. I presume I handed out today a list of questions. For those of you who were at the subcommittee meeting last Wednesday, those questions stem from the subcommittee; they stem from discussions Dave Argue had with Hydro, and they stem from input I received from members' personal insights.

Those questions have also been made available to Ontario Hydro, so presumably tomorrow and the next day they will be coming in–Mr. McConnell assured me of this earlier–and they will be prepared to brief us and respond to this list of concerns. Of course, they will be willing and able to respond to any other concerns that surface.

Mr. Charlton: Is that the B list, Jerry?

Mr. Richmond: Maybe you have a B list.

Mrs. Grier: What about their own list?

Mr. Richmond: Sam has Darlington B.

Where was I? As you see, the questions have been organized to follow as best possible the strategy elements in DSPS. The other document that I would direct your attention to is that las week the clerk distributed the summary. Th may be useful. It is not completely up to dat because we have been meeting virtually nonsto It should prove useful if someone wants to get sense of some of the range of testimony we hav heard.

On page 1 of the summary, there is a mo preliminary list of issues. There is some similar ty with those issues and the questions or issue addressed in the questions. I would just mak sure that, out of the mountain of materia everyone has at least those two documents. I tu the floor over to Dave Argue.

Mr. Argue: The second package you receive today was a series of issue papers followin along the lines of the questions we discussed the subcommittee meeting and prepared. I poi out that there are attachments referred specifically in the issue papers. I point out th when the package was stapled, it was staple somewhat out of order. The attachment for issu paper 2 actually comes before the issue pape introduced.

Mr. Chairman: Thank you, Mr. Argue. I wi adjourn the committee until 10 o'clock tomorro morning.

The committee adjourned at 5:40 p.m.

CONTENTS

Monday, October 3, 1988

SELECT COMMITTEE ON ENERGY

hairman: Carrothers, Douglas A. (Oakville South L)
ice-Chairman: McGuigan, James F. (Essex-Kent L)
rown, Michael A. (Algoma-Manitoulin L)
harlton, Brian A. (Hamilton Mountain NDP)
ureatz, Sam L. (Durham East PC)
rier, Ruth A. (Etobicoke-Lakeshore NDP)
latrundola, Gino (Willowdale L)
ay, Michael C. (Windsor-Walkerville L)
unciman, Robert W. (Leeds-Grenville PC)
outh, Larry (Frontenac-Addington L)
ullivan, Barbara (Halton Centre L)

ubstitution:
ollock, Jim (Hastings-Peterborough PC) for Mr. Cureatz

lerk: Manikel, Tannis

taff:
rgue, David, Consultant; with Passmore Associates International
ichmond, Jerry M., Research Officer, Legislative Research Service

itnesses:

ndividual Presentations:
onnor-Lajambe, Dr. Hélène, Economist, Hélio-Québec
erkowitz, Dr. Michael, Professor, Department of Economics, University of Toronto

rom the Department of Energy, Mines and Resources:
liffe, Kevin, Assistant Director, Co-ordination and Strategic Planning
acaluso, Nick, Economist
den, William G., Director, Ontario Region, Conservation and Renewable Energy

Ontario

No. N-24

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy

Electricity Demand and Supply

First Session, 34th Parliament

Tuesday, October 4, 1988

Speaker: Honourable Hugh A. Edighoffer

Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the bac[k] together with a list of the members of the committee and other members and witnesses takin[g] part.

Reference to a cumulative index of previous issues can be obtained by calling th[e] Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Servic[e], Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toront[o] M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

STANDING COMMITTEE ON ENERGY

Tuesday, October 4, 1988

The committee met at 10:08 a.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY (continued)

Mr. Chairman: Could I call the morning session to order, please? Our first witness this morning is Dow Chemical Canada Inc. As I said last night, they have produced a paper for us which was handed out prior to this. I hope the members have brought it.

Mr. Trask, I guess you are heading the panel. Perhaps you could introduce the rest of your panel. I would ask you to perhaps summarize the paper for us and then we will have a period for discussion and questions after that summary.

DOW CHEMICAL CANADA INC.

Mr. Trask: It is a pleasure to be here this morning. As the chairman has already said, we made a presentation or a written submission on September 14. We are here this morning to give a little introduction and to then clarify any questions that you may have as a committee opposite our presentation.

My name is Murray Trask. I am vice-president of manufacturing for Dow Chemical. At Dow Chemical, we are very interested in energy and energy costs in that we use about 200 megawatts of energy. I have with me Dennis Barnes, who is sitting in the centre, second from the end. He is our eastern manager of hydrocarbons and energy. Don Dukes is next to me. He is major manager in our Sarnia division. At the end is David MacLachlan who is the manager of government affairs for Ontario.

We are pleased to appear here before this committee to share with you our thoughts on future electrical energy needs in Ontario. Hopefully we can help you in your deliberations and hopefully we can help you as you choose the best course for Ontario Hydro to follow to best serve the electrical energy needs of the province.

I do not envy you because future energy needs, and forecasting of them, is difficult at best. Predicting electrical energy needs accurately for a whole province is virtually impossible. Now, during the current rapid expansion in this province of the economy, growth in electrical energy has gone hand in hand and exceeded, I am sure, Hydro's expectations and certainly the numbers that have been in for growth rates.

Current forecasts, if you look at them, and you all have been, have certainly put pressure on looking at where Hydro is going to meet the needs. Some forecasts have Hydro running out of the reserves required by 1996, according to Hydro's own forecasts for the most probable case, by 1992, according to the Joint Industry Task Force commissioned by the government and by 1992, according to the Association of Major Power Consumers in Ontario's study. Some of these time frames may appear long off, but as we know and as you know, depending on the size of the entity you are considering, it is all too close.

One of the suggested cures for an anticipated supply crunch is to encourage cogeneration. That is what we would like to talk to you about this morning. The Dow Chemical company pioneered cogeneration in the United States. Dow Canada installed its first cogeneration unit in 1963, as indicated in the submission that we handed out on September 14.

The gas turbine, together with the steam recovery system used at Dow's Sarnia division, has many advantages. First of all, the fuel is natural gas to minimize any pollution problems. The system has about 80 per cent efficiency versus less than 40 per cent for conventional power generation operating facilities. It is all due to the recovery of steam. In other words, we can take the waste heat and convert it to steam and use it to manufacture chemicals. In addition, remote generating facilities help relieve some of Hydro's transmission difficulties in remote areas of the province.

Now I would like to carry on and talk about some concerns we have. We are concerned about the transmission capability into the Sarnia area. We know that the line carrying capability is limited. Even this summer we were faced with quite a few power cuts because we are on a supply situation that allows us to have Hydro ask us to cut our demand. We are concerned about the capability in the Sarnia area regarding the shortage of power. That is in the short term because of lines. The longer term, I know, is your concern because of generating capability.

The restarting of our third turbine could help alleviate the transmission problems. As we presented it to you on September 14, we have had a turbine shutdown as of 1983. That is what we want to present to you as a possibility that we have. The main thing we would like to get across to the committee is a look at the costs associated with that type of thing so that you as a committee can better assess the probability of cogeneration and the costs associated with it if it is going to be a major entity in your scheme of things on how to supply Ontario with hydro.

The second problem we have is based on the latest price that Hydro has offered to pay for privately generated power. In that price, there is not sufficient return of investment–an investment we would have to make for other companies to interest people to invest in new cogenerating facilities. With current pricing, there is no way to entice people into cogeneration as we are talking about with gas turbines and steam generation.

The third concern that we have emphasizes the need to keep power competitively priced. As you know, we are a worldwide industry. Out of the Sarnia division, we sell between 15 per cent and 20 per cent of all our products outside of Canada, but at Dow Canada, we sell close to 30 per cent of all our products outside of Canada. We need to have a competitive power situation that will allow us as an industry to maintain that competitive position.

Ontario industries require low-cost power to be competitive. Dow Canada has the ability to control our power costs by cogeneration. Many companies do not have the right mix of steam and power to do this.

Now I would like to show you a few overheads, talk to them a few minutes and then open up for questions so that we can ensure that you understand cogeneration and the possibility that we, as Dow Chemical, have to add extra megawatts to the generating capability of Ontario.

Very quickly, this is a look at a normal system that the chemical industry or any other industry that needs steam would have to invest in. It is a simple, low-pressure boiler that will put out 150- to 450-pound steam. It uses natural gas to provide the steam generation, and in addition to that, it would require buying power from Ontario Hydro. Those two utilities would then go to make up the requirements to run factories or industry.

This is a look at a cogeneration cycle that I have been talking about this morning. You use fuel; it goes into a high-pressure boiler; you make high-pressure steam, and with the high-pressure steam, you let that down over a turbine to make power for industry or for grid use. With the lower-pressure steam that you would already get from the other conventional boiler, you can then go and use it for process. In that way, by just making higher-pressure steam and using the pressure to make power, you can get steam and power from the same gas.

The cogeneration gas-turbine combined cycle, as we refer to it, is the situation that we were discussing in our presentation to you on September 14 and what I have been talking about this morning. In this case, we use gas to go through a turbine. With the hot turbine gases, you generate steam, but the turbine drives the generator which in turn supplies power to the process or to the grid for other companies to use.

In this case, in the Sarnia situation, we have three gas turbines. We have two of them operating. One is not operating, because of the situation that I expressed earlier. In Sarnia, we have the capability to start up a third turbine and generate additional power, which would not only satisfy our needs but allow us to put some energy into the grid. The advantages, of course, that the grid would see from that is stabilization of the grid, because we happen to be at the end of the supply situation in Sarnia and any loads that are heavy or intermittent can tend to destabilize the power generation from a cycle point of view. Putting extra capability does add some stabilization.

1020

Please feel free to question anything I am putting up. I have just one more slide to show you after this.

That is our current condition. That is what we generate. We purchase about 30 megawatts. On average, we use up to 200 megawatts, and, if you read our submission, we say we use about 25 per cent of the power of the city of London. So we are a major power user and thereby we are a major power producer as well.

We would go from a purchaser of 30 megawatts to an ultimate contributor of 5 megawatts into the grid with a scheme of putting a third turbine, a cogeneration-unit gas turbine on line.

That is all I wanted to present to try to clarify the presentation we made on the 14th. We are now open for questions and would be pleased to stay here as long as you have questions and as long as we fit into your time scheme.

Mr. Chairman: Are there questions from the committee?

Mrs. Sullivan: I am interested in talking about one matter that you raised in your recommendations relating to the calculation of the value that Ontario Hydro pays for the generation you produce. I wonder if you could expand further on your position. I understand your position is that the capital costs of increasing our capacity should be a base for the calculation of Hydro's payments. There are other methods of calculating that cost and I want to know why you particularly think capital costs should be the factor.

Mr. Trask: Our position is that if cogeneration is going to be a major entity in the scheme of supplying energy needs–for people to invest in generation of any facility, capital needs to have a return. For people to get into the business of generating power, there needs to be a return on their money, and that means total cost needs to be covered, plus a return on capital. No independent person, company or entity will invest money without some return on it. Whatever the cost structure is, it has to be attractive to the persons with money.

Mrs. Sullivan: Are you not recovering some of your capital costs through operations, in that your self-generated power would be a lower cost than what you would be buying from Hydro, or is it comparable because you are on interruptible rates?

Mr. Trask: To do this project, we have to spend $27 million. This project is not sitting there waiting to turn it on, and for us to spend that money, we need to have a guarantee at every turn. What our current cost situation is does not really reflect on our capability to use it for this. In other words, the power we are generating now is used internally, and for us to spend that $27 million, we are saying we need to get a return on those dollars, and the current pricing is not sufficient for us to do that. Does that answer your question?

Mrs. Sullivan: I think so. Basically what I was talking about, what I was trying to understand was how the long-term cost to you of your self-generated power compares to the cost that you would otherwise pay to Hydro.

Mr. Trask: Our costs are very much determined by gas costs, so you have to put that into the structure when you talk about long-term costs.

Mrs. Sullivan: When you are calculating the long-term gas costs, I assume that you have already negotiated long-term supply.

Mr. Trask: I will let Mr. Barnes answer that.

Mr. Barnes: No, not completely. We have both short-term and long-term gas contracts, but pricing is basically variable, right through the term we are looking at. When we look at this project, we obviously have to make some judgement as to what the gas cost is going to be, as well as what we can sell the power for.

Mrs. Sullivan: When you are in negotiations for long-term supply, are you finding that the gas suppliers are requiring an escalation clause that is based on time?

Mr. Barnes: An escalation clause is something the gas producers want. In conjunction with this project, we have been trying to get some gas suppliers that will escalate with whatever the selling price would be to Hydro, but we have not been completely successful in that regard. We certainly have people who have expressed an interest in a long-term contract with escalations that take into consideration what we would get for selling power, but we do not have the escalation down such that that would be the only escalation factor.

Mrs. Sullivan: Based on Hydro's rates, you are not able to get that from the supplier.

Mr. Barnes: Not completely; that is correct.

Mr. Pollock: My question is along the same line as Mrs. Sullivan's question. You are not operating that third generator because it is just not financially feasible. Right?

Mr. Trask: That is correct. Our position is the balance between the steam and the power, and if you cannot use all the steam, then it is not attractive from a cost point of view. The dollars we would have to spend would be to change the cycle around so that we could make better use of the surplus steam.

Mr. Pollock: I know that Ontario Hydro pays for power produced right now by individuals, that sort of thing. How much more would you have to have, above and beyond what Ontario Hydro pays right now, to actually phase in that third turbine? What percentage?

Mr. Trask: My understanding is that Ontario Hydro pays costs in respect to its out-of-pocket-type costs–we call them incremental–which does not take into effect the capital it has invested. If you were to take a typical 25-megawatt facility and invest in that today and if you were to have steam generation and pay $3 for gas, you would be paying between 50 and 65 mills–it is somewhere in there–for full cost, with a 20 per cent return on capital.

Mr. Pollock: That is what you aim for: full cost and 20 per cent return on capital.

Mr. Trask: This is an example. We would have to have somewhere near a 20 per cent return.

Mr. McGuigan: We have been told by many people who have been presenting to us that if they cannot recover the cost of, say, the generator in three years, they are not interested. Do you agree with that statement?

Mr. Trask: I disagree with that statement.

1030

Mr. McGuigan: You would go over a longer period than three years then.

Mr. Trask: Yes.

Mr. McGuigan: That helps us quite a bit.

Mr. Trask: The numbers I just quoted were based on a 10-year project capital write-off.

Mr. McGuigan: I notice you said 20 per cent return, yet a number of people have told us that corporations look for about 14 or 15 per cent return on their overall investment. Why do you place a roughly five per cent premium on cogeneration?

Mr. Trask: Are you talking before tax or after tax?

Mr. McGuigan: After tax.

Mr. Trask: I am talking before tax. So there is five per cent negative.

Mr. McGuigan: It would then be in the 14 or 15 per cent range.

Mr. Trask: Yes, this thing I just presented to you would be 10 per cent to 15 per cent.

Mr. McGuigan: I passed by the complex there, the Dow Chemical refining process in Sarnia. I cannot separate in my mind where those flares come from, but you go by that area and you see a lot of gas being flared off. Is there a reason that that gas is not used, say, for cogeneration or for in-house purposes? I guess you go by any refinery and you will see big flares going by. I wonder if you could comment on that.

Mr. Trask: The fundamental use of a flare is for emergency. If you have a process upset, you can release the hydrocarbon to a flare so it can be burnt in a safe manner and you keep your process safe. For that to be used in an energy-generating cycle is too difficult because you can have lots of energy, then you have very little. That is the major use of a flare. People do not flare just for the purposes of getting rid of something. If it is a consistent energy source, we would put that back in for energy use. But it is usually in a startup condition or some area where you might hav pump seals or something you vent to a flare, i they leak and those types of things.

I think you can rest assured that energy i expensive enough that the chemical industry wil be trying to capture every source of energy it ca rather than flare. If you look at our industry sinc 1972, the industry as a whole, if you were to g back through the chemical energy sector, about 40 per cent energy conservation has bee obtained over that time. We are very competitiv and with energy conservation starting in 1972–o course, with the Arab embargo it became ver trendy to do that, but not only that, it is goo business.

Mr. McGuigan: Are some of those flare Dow Chemical? Or are they mostly in refineries

Mr. Trask: We do not have any flare that run continuously, other than a pilot. Both ou low-density and high-density plants have a pilo that runs and is there if we need it, but we do no flare continuously.

Mr. McGuigan: Where you are talking abou using gas to run your turbines, would it not b technically feasible to flow in that flared gas even though it is intermittent, when it i available?

Mr. Dukes: It would be difficult to contro because you are getting a huge amount of energ in a very short period into either a boiler or a ga turbine. It would be virtually impossible t control that but it is usually going to be there for few minutes at the most, because there are n signs when those flares are going at their peak They are operating for a matter of minutes, no going over a period of hours. It is until a proces plant gets over its emergency condition. T suddenly to try to inject this major amount of fue into a gas turbine or a boiler would be plai dangerous. We would not be able to control it.

We have had experience in the past of actuall putting continuous vents into our gas turbines The particular unit we got it from is now n longer operative, but for a number of years w did inject a waste stream into our gas turbine rather than vent it.

Mr. Trask: We have that situation in For Saskatchewan in Alberta right now, where w have continuous gas streams going into ga turbines, but they are continuous.

Mr. McGuigan: It has been some time since have driven by the Sarnia complex. It strikes m that, at least at the refineries, there was always gas flare. Has that changed?

Mr. Trask: You are probably right. There is always some gas flare.

Mr. McGuigan: But not necessarily from the same source.

Mr. Trask: No. They usually have headers, where you flare it into, and they come from multisources throughout the plant. Consequently, it is a small quantity at any one place that would be available and it is intermittent. It is as if you tried to burn a gasoline tanker through your car in a few minutes; in other words, it gets pretty difficult to do. So you have to build the car to burn a tank-truckful of gas in a few minutes.

It is not that it is not technically feasible; it would be technically possible, I suppose, but we would have to put in a storage facility and then we have to compress it. It would be a mixture of air and gas and that is another safety problem we would have to deal with. There is no incentive from a return point of view. All the return incentive gas will be used, you can rest assured.

Mr. McGuigan: That answers my question.

Mr. Runciman: What kind of facility is this in Sarnia? What do you produce there? What products?

Mr. Trask: Mr. Dukes, do you want to answer that?

Mr. Dukes: Basically, the products would be based on two materials: One is chlorine–we produce chlorine and caustic–and the other is hydrocarbon-based, as Murray referred to, polyethylenes and materials like that. We get into chlorine derivatives, such as vinyl chloride monomer, which ultimately goes to the polyvinyl chloride market; solvents, such as carbon tetrachloride and perchloroethylene, cleaning solvents, and a good range of plastics. The chlorine part of our operation is very heavily energy-intensive.

Mr. Runciman: How does natural black gas play a role in your process? It is a requirement, obviously. It is not just as a heating agent or as a power generator; it is part of your process as well.

Mr. Dukes: Not directly in the Sarnia division. In the Sarnia division it is mainly used in the production of energy. We do have some cracking furnaces in the vinyl plant and the styrene plant that require gas, but we do not produce our own ethylene in Sarnia and out west. A derivative from the natural gas in ethane is used to produce ethylene, and we use the ethylene in the Sarnia division.

Mr. Runciman: On this third turbine you have been talking about that is mothballed, when it was originally installed, what was the plan in terms of the installation? Was it looked upon at that time as needed for the process, or was there a long-term goal to generate your own electricity needs?

Mr. Trask: Let me answer that question, because it ties in very well with Mr. McGuigan's. We installed the third turbine–and we are calling this the third turbine–but this one was installed prior to the last one we installed. At that time, we had a demand for all the steam and the power with the cycle that we were using. But with energy conservation, we have been able to reduce our steam requirements to the degree that we do not need all the steam. When you do not need the steam, then you do not have the advantage of the 80 per cent efficiency from the cycle; you get down again close to 40 per cent efficiency. With that lower efficiency, it is not attractive to run it.

Did I keep you straight all the way through there?

Mr. Runciman: So if, indeed, you are putting this turbine on line, it is primarily to generate electricity; it is not going to meet any of your steam needs at all.

Mr. Trask: No, we have to change the cycle to use the steam in another manner to make more power.

1040

Mr. Runciman: You talk about conservation and you have obviously been into some sort of a program and reduced your steam needs. How does that tie in with electricity consumption? Is there some sort of a parallel reduction in demand there as well?

Mr. Trask: Mr. Dukes could speak to that. He has been in charge of energy conservation in the Sarnia division.

Mr. Dukes: Basically, we are not just looking at steam; we are looking at any form of energy, be it electricity, natural gas or steam. Overall, any place where we can see a way to reduce energy and, in other words, reduce our costs, we are working on it.

In new projects we certainly look at things like high-efficiency motors, and that is taken into consideration as part of our evaluation. We look at our process to see what we can do overall to reduce energy as a whole. We are not particularly looking at one form of energy. It is energy and it is in total.

Mr. Runciman: What has happened, you have indicated, in terms of steam consumption, is that you have been able to reduce your

requirements. I am asking, in terms of the megawatt consumption or what have you, have you been able to have a meaningful impact on that over the past number of years?

Mr. Trask: The answer is yes. The problem is that nothing is stagnant. If you were to go back to what we were running year by year, you would say, yes, we have had a meaningful impact. We have been spending quite a lot of extra money and effort, and it involves utilities and the environmental field, some of these things, plus the change in the plant contacts. But in the chlorine area where we use the major amount of electrical power, we have been able to reduce energy.

Mr. McGuigan: May I come in?

Mr. Runciman: Sure.

Mr. McGuigan: Mr. Runciman brought up the point that you do not need the steam from the third generator and therefore your answer was that you will not pick up an 80 per cent efficiency. In a sense then, as I understand it, it really strictly could not be called cogeneration. Am I correct in making that assumption?

Mr. Trask: We will change the energy cycle to use the steam to make power versus raw steam in our processes, so it is still cogeneration.

Mr. McGuigan: But you would get greater efficiency in using the raw steam in a process than in completing that cycle. Is that correct?

Mr. Dukes: It is marginal. As we look at these things, we are looking at improved forms of technology. Since we first put the gas turbines in in 1972, we have looked at different forms of cycles and have done more work on it. We have found ways where we can get almost as good efficiency using a limited amount of extra steam within the cycle.

We are not using it, condensing the steam, the same as Hydro does. We are looking actually at reinjecting it into the gas turbine, which will give us extra power. It is another way of using it efficiently, a lot better than the 38 or 40 per cent which is about the best efficiency Hydro can claim with condensers.

Mr. McGuigan: But you still would not get up to the 80 per cent, where you were using the extra steam for processing.

Mr. Dukes: The whole cycle would be.

Mr. Trask: You have to understand. When we say 80 per cent, that is 80 per cent around the utility unit. We are assuming that the plants are going to use it efficiently. So we cannot determine whether the plant use is efficient or not in that number because 80 per cent is strictly a utility number. What Mr. Dukes is saying is tha on a utility basis, the efficiency would be abou the same, even though the plants never see th steam.

Mr. McGuigan: So it does qualify for th term "cogeneration"?

Mr. Dukes: It is cogeneration, yes. Could just add something to the question you are askin about electricity? That is something that Mr Trask mentioned. One reason we found it may b difficult to measure the terms of electricit savings is that, as Mr. Trask said, we have nc stood still. We are producing more product an therefore our electricity load has not dropped.

Compared with, say, 10 or 15 years ago, w are producing more chlorine. Chlorine is ver electrically intensive. Per pound of chlorine, yes we have improved, but our total requirements fc electricity have actually gone up.

Mr. Runciman: What, if anything, are yo doing to try to reduce your consumption whil maintaining your production levels? Are yo undertaking any new initiatives to try to conserv energy, electricity primarily?

Mr. Trask: The biggest usage, as we mer tioned before, is opposite our chlorine manufac turing. Between 50 and 60 per cent of the cost c chlorine is hydro cost or power cost, and we hav been installing new electrolytic cells. You tak salt and you separate it with electricity int sodium and chlorine. These cells that have ne technology have reduced our power require ments per pound. We are just completing th whole turnaround in our two plants.

Mr. Runciman: I am glad to hear you a doing that. I am curious about the other elemer of the price negotiations with Ontario Hydro i terms of getting the third turbine on line. Are yo still carrying on negotiations with Hydro or i that a dead issue?

Mr. Barnes: No, it is not a dead issue. Th problem we have had over the last five months really, is that, as I am sure you are aware, ou union is on strike. All the people who would b working on this are working in the plants. W just have not had the people to pursue it further

Mr. Runciman: Where does it stand?

Mr. Barnes: We will still go back and talk t Hydro and the gas producers. We have to marr the two, as we talked about earlier. It is not just case of talking to Hydro. We have to try to matc up a gas supply with the kind of arrangement th Hydro requires. Its position is that it would like 20-year contract, but a minimum of 15, so part

ur problem is matching up a gas supply greement for the same duration that we would ave to sign up with Hydro for selling it power.

Mr. Runciman: Do you more or less compete /ith comparable facilities within the corporate tructure, for example, in the United States? You ıentioned that you have to have low-cost power ɔ be competitive. I am just wondering if you ave any kind of analysis within the corporate tructure where you compare with Dow facilities, for example, in the United States. Do you ıke a look at those kinds of figures?

Mr. Trask: Yes, we compare them world-/ide.

Mr. Runciman: Where does Ontario stand in ıat picture?

Mr. Trask: Mr. Barnes might be better off to ılk to that. It is about fourth or fifth in Canada; ɔurth, I guess.

Mr. Barnes: It varies east and west. Generally peaking, I think our costs are lower than in urope but tend to be higher than on the US Gulf oast. The gas pricing on the gulf is probably 20 er cent more.

Mr. Trask: You have to remember when we ay this that we are cogenerating in all the areas /here we manufacture chlorine.

Mr. Barnes: Yes. So, in effect, since they ave lower gas costs on the Gulf coast, obviously ıeir power costs would be lower. Also, the ower utilities on the Gulf coast pay much more or power than we have been offered by Ontario Iydro.

Mr. Runciman: Okay, thank you very much.

Mrs. Grier: When you shut down the extra urbine in 1983, you then had to purchase power rom Hydro. Do I take it, then, that the cost to ou of producing your own power must have een greater than what you were buying from Iydro?

Mr. Trask: That is right but, as I indicated, ıe rationale was that, without spending a lot of ıoney, we could not use the steam efficiently. hat then, together with the gas price at that me–if you look at the gas pricing, it has been oming down–made it inefficient or not attracve for us to continue.

Mrs. Grier: Can you tell us what kind of a uyback rate you have with Hydro now when you o sell excess power to it?

Mr. Barnes: I am sorry, I do not know /hether Mr. Dukes can do that. Currently we ave what is called an at-will rate, which is an verage of our incremental costs and Hydro's incremental costs, because actually we are short of power generation now. We really have not been selling power back, so I would not know what the costs are.

Mr. Dukes: We do not have any firm arrangement with them at this stage. If we are in a situation where our generating capabilities exceed our plant requirements on a short-term basis, we put it back into the system and they do pay us what they call their at-will rate.

1050

Mrs. Grier: Can you give us any indication of what the buyback rate would have to be to make the refurbishing of the third turbine attractive?

Mr. Trask: When we started into this project, we thought that Ontario Hydro was offering 36 mills for power for cogenerators, and that led us to start to think about this, in that we have some capital already invested in it. But as we have gone down the pathway, we have found out that 36 mills apply only to people who made less than five megawatts, I believe. I do not understand the rationale of that, but the current situation, as we see it, is not attractive to us.

As I indicated, if you wanted to invest solely to sell power to Ontario Hydro or to anyone and to get a 20 per cent return on your money and if you could have steam usage, you need to be somewhere between the 50 and 65 mills with a $3 gas purchase.

Mrs. Grier: Is the mechanism of an increased buyback rate the most effective way to encourage the kind of cogeneration you are talking about, or is some system of capital grants preferable? If you had your druthers, how would you like it to be approached by Hydro?

Mr. Trask: I guess we would not care. If somebody has money that is available for nothing, we would take that. If somebody wants interest on his money, we would like to get a return on that money that we have to borrow as well. So all we are saying is that it is not real to expect, in the long term, to help Ontario Hydro's generating capability without paying for the capital costs. It is very fundamental. Nobody gets into spending money without a return on that investment.

Mrs. Grier: We have heard that over and over again from, I think, every witness before this committee. Are there any other barriers? For example, one of the other things we heard was that the lack of any kind of standard contract was a disincentive to industry to embark on these negotiations with Hydro.

Mr. Trask: Dennis has approached that.

Mr. Barnes: I guess we have never considered that a barrier. We have considered that if the economics are right, we would have no problem with the contract, certainly. We have had contracts with Ontario Hydro since, I guess, the mid-1960s and, prior to that, the Sarnia Hydro-Electric Commission, so we would not anticipate that as a problem. We have not got that far, so I cannot say unequivocally yes, we would not have a problem.

Mrs. Grier: I recognize what you said about the last six months, but when did you first begin discussions with Hydro around this project?

Mr. Barnes: I would say last fall.

Mr. Trask: At least one year ago.

Mrs. Grier: Last fall. And what sort of time frame are you working towards? By when do you have to have a decision, or it is too late to consider that turbine?

Mr. Trask: Well, we are going to change our cycle to make better use of our energy. If we commit those dollars, it will be on a different scheme than bringing the third turbine in. We have both proposals worked out and we will have this opportunity to make that decision. We think it would be the wrong decision to not generate power, but on the other hand, we are not going to stay continuously where we are. So I would say that we are looking at six to 12 months before we would make a decision the other way if we cannot come to some reasonable arrangement.

Mrs. Grier: Okay. Thank you very much.

Mr. Trask: I would like to say that we have another major facility in Edmonton with TransAlta, with which we have a very amicable arrangement where we buy and sell bank power and do many other things to the benefit of both ourselves and the utility, so we know this is a very workable situation to have cogenerators on the distribution with a major generator like Hydro.

Mr. Charlton: Just very briefly, you mentioned earlier in your presentation some concerns about the future of gas prices in this whole scenario around the potentials at your plant. Have you talked to people from the gas industry recently in terms of the potentials around a long-term contract?

Mr. Barnes: We are continually talking to the gas people. As I mentioned earlier, we have some short-term and some long-term contracts, so we have continual dialogue with them. This relates to our use of gas, both east and west. Th[a] conversation is going on on a continuing basis

Mr. Charlton: The reason I am asking th question is that we had the gas people an TransCanada PipeLines Ltd. as well in here th last week. They were describing for us what essentially, I would gather, a new approach th they have taken in terms of the question o parallel generation. That is negotiating long-ter contracts where the price is, in effect, tied to th price of electricity.

Mr. Barnes: I think I mentioned that we hav talked to them. They certainly have indicate they are willing that that be part of the escalation, but to date, not their total escalation

Mr. Charlton: I see.

Mrs. Sullivan: I wanted to move away fro specific Dow Chemical matters and move mo into a general discussion of the purchase rates, we could. One of the things that I think has bee brought forward to this committee is the uncle nature of the long-term price of gas, by example

In your own case, you made a decision partl based on the price of gas at that particular time cease using a turbine. That was not the onl reason, but that was certainly one of the factor Over the longer term, have you analysed or d you know whether people who are looking cogeneration as a serious industrial benefi Have you taken into account what happens whe the gas price increases and, indeed, over a long period of time, at what point cogeneration do again become uneconomic? Is that a factor i your planning?

Mr. Trask: The relative position between th purchase cost of hydro and gas prices is ver important to us. You need to take decisio opposite where you think they will be before yo commit capital dollars. So yes, I cannot tell yo where we think they are going to be, but that is very important issue.

Mrs. Sullivan: One of the things that understand is very much a part of the long-ter gas contracts is a cutoff or a smoothing. Whe supply is not adequate, it is cut back to everybod rather than to specific customers. Have yo found that to be a problem in the kinds o negotiations you are doing with the gas sup pliers?

Mr. Barnes: The gas suppliers certainly hav not raised that as an issue in their negotiations. think that would occur only when there is shortage of gas in Canada. I do not think that envisioned over the time frame that we a talking about. Certainly we do not feel that it is

Pricing may vary over this period, but I think the supply will be there. Certainly one of the concerns, of course, being expressed about free energy is that there is some concern about what happens if gas starts to run out, but we have not worried about that one at this point.

Mrs. Sullivan: I wonder if some of the problem might not be only with supply but also with transmission.

Mr. Trask: I was just going to say that deliverability might be the only concern.

Mr. Barnes: What we would do and would have to do if we go into this kind of arrangement is that we would have to have a firm transportation agreement with TransCanada. Today, the way we buy gas now is that we do that. We commit to a certain capacity in the pipeline, and that is firm capacity. So presumably, as long as we have that firm capacity, TransCanada has to honour it. If they cannot commit more firm capacity than they have, then they should not.

Mrs. Sullivan: From your experience–this is going to sound like a dumb question–what size plant in fact can provide an economic base for cogeneration? Would it have to be a big operation like Dow?

1100

Mr. Trask: The important thing is to have the steam requirement. If you do not have enough steam, you really cannot start into this. A lot of companies, I think, are fortunate that they have a lot of steam but little power, and then the power will limit it. But there are quite a few that could generate some cogeneration of an electrical power–most of the pulp and paper mills, for example. Certainly there are other companies in the Sarnia area that would have a steam requirement that would allow them to generate some megawatts of power.

Mrs. Sullivan: What would be your lead time on the third turbine?

Mr. Dukes: About two years.

Mrs. Sullivan: Would you be anticipating environmental assessments in association with bringing that back into operation?

Mr. Trask: I do not think so. We already have an operating permit for it. If we changed anything, we would have to go up to a repermitting situation.

Mr. Dukes: We have a certificate of approval just for the three gas turbine operations.

Mrs. Sullivan: Once again, looking back specifically to your own project, you said today that $27 million was the full capital cost. I understood from your brief that $21 million was associated with a total revamp of your cogeneration and that really only $7 million was the amount of money that is involved in the negotiations with Hydro.

Mr. Trask: That is about right.

Mrs. Sullivan: So the capital cost that you want Hydro to include as part of the avoided cost is only the $7 million, not the full $27 million or $28 million?

Mr. Dukes: I think one thing we have got to remember here is that we are looking at a unique case here. If we are looking at cogeneration as a whole, for, say, a pulp and paper mill that just has its package boilers, as we showed in the example, the costs are going to be a lot higher than with us, where we are really into a refurbishment.

Mr. Trask: The point I was trying to make here is that if it is going to be a significant entity in Ontario Hydro's capability to deliver power, cogenerating power has to have a return. Every company will be unique to itself, but the project that I talked about was an independent, stand-alone, spend money, make 25 megawatts type of thing.

Mr. Barnes: Could I add one thing, please, to that answer? Maybe I am a bit closer to the numbers than these fellows, but the difference in the numbers is that, if we went to cogeneration, we would not spend some of the $21 million. The $21 million is to redo the system on the basis of a two-turbine operation. If we went to a three-turbine operation, there are some dollars that we would not have to spend as part of the $21 million. So to get the third turbine back on line would be more than $7 million.

Mr. Trask: And the project changes as well.

Mr. Dukes: Yes, the scope of the project changes quite a bit.

Mrs. Sullivan: Yes, I understand.

Mr. McGuigan: I hope there is a point here that would help us to understand. Most of us come from small business situations and, in a small business, when you start something out with great hopes and realize halfway down the road that it is not making the money that you had hoped it would make, you still do not have the luxury of shutting it down, because it is going to cost you more money to be shut down than it does to continue. I sort of gather that in looking at your operation, where we will say for argument's sake you might already have $5 million in your turbine now, you would not look at starting at the end of that $5 million, spending another $21 million

more and getting a return on the $21 million. You are going to get your return on the $21 million plus the $5 million or you are not going to operate. Would that be the way you approach it?

Mr. Trask: No, we are talking about new moneys here.

Mr. McGuigan: So you do just talk new money. You are not quite as hard-nosed as one might expect. You could be in the purest sense.

Mr. Trask: The asset is not worth anything if it is not running, okay? So what we have to do is to spend money to get it so it can deliver, as we had discussed, so we are talking only new money.

Mr. McGuigan: I think that point is important in understanding people like yourselves, where capital is not a great problem with you. You can get capital whenever you want to get capital and you can make hard-nosed choices, but you still regard the money that is spent as largely paid for or lost.

Mr. Trask: Committed, gone.

Mr. Passmore: You said that it is Hydro's parallel generation policy that essentially makes Dow a net consumer of 57 megawatts as opposed to a net contributor of 30 megawatts. I do not know if I have got the numbers exactly right.

Mr. Dukes: Reversed.

Mr. Passmore: The point is that you are a net consumer as opposed to a net contributor to the grid. There have been a number of witnesses appear before this committee who have said this debate should be aired in a forum beyond, in this example, Dow Chemical negotiating with Ontario Hydro. Do you have any views on who should establish a policy on parallel generation that might better enable the sort of project that you are talking about to proceed?

Mr. Trask: Dennis does most of the discussion.

Mr. Barnes: That is a difficult question. In our experience, we have always negotiated one on one, and I cannot really envision any other way of doing it. In the sense that the government has chosen to look at this, I guess you are in a much better position than we to decide on the sort of forum.

Mr. Passmore: I am thinking of a policy question. When you get down to the specific negotiations of contract terms and conditions, obviously, you would negotiate with Ontario Hydro. But in terms of a policy to determine whether or not parallel generation should be encouraged in order to enable you to become a contributor as opposed to a consumer–in other words, if you could get those 50 to 65 mills that you spoke about–where would that policy emanate from?

Mr. Trask: We do not have the answer to that. It would seem to me, though, that if Ontario Hydro or Ontario were prepared to pay the same costs to people who would spend their money to generate power as it would cost Ontario Hydro to generate power, that would be an appropriate place to start. In other words, if the people are going to invest their money in Ontario Hydro to generate power, and that is a cost, I guess we are saying those are the same type of costs that an individual company has. If the same costs were available to individuals–and I am talking about total costs now, and capital costs are part of that total cost–then as a policy it would be very simple to establish, if you feel that is an important part of the long-term structure of generating power.

Mr. Passmore: And that policy directive should come from government.

Mr. Trask: Well, whoever controls Hydro.

Mr. Passmore: What is your current industrial rate?

Mr. Barnes: For power?

Mr. Passmore: Yes, what are you buying it for?

Mr. Barnes: It varies, of course, because of load factor, and our load factor is not all that great these days.

Mr. Dukes: Not with the increments.

Mr. Barnes: At 35 mills, firm power is at what load factor?

Mr. Dukes: That was 90 per cent.

Mr. Barnes: Ninety per cent; so we are interruptible. The Hydro fellows probably could tell better what the discount is from firm if we were buying interruptible.

Mr. Dukes: Your load factor affects it considerably because there are the two components: the capacity charge and the energy charge.

Mr. Barnes: We have a standard contract with Hydro, and the plant operates to the lowest cost possible; so it could be a very low load factor one month and a very high load factor the next month.

Mr. Dukes: We purchase interruptible power at 230 kilovolts at the published rates.

Mr. Passmore: Are you familiar with the terminology "simultaneous sale and purchase"?

Mr. Trask: I am not.

Mr. Dukes: No.

Mr. Passmore: It is a situation where in some jurisdictions, primarily in the United States, cogenerators like yourselves would buy power from the utility at the industrial rate or the wholesale rate and would sell back power into the utility grid at the avoided cost. Is that the kind of arrangement, assuming that avoided cost was in the 50 to 65 mills that you are speaking about, that would be attractive to make your project proceed?

1110

Mr. Trask: I would have to look at that.

Mr. Barnes: Our Texas division has that kind of arrangement. It is very profitable for them, because the buyback rate is much higher than the sale rate from the utility.

Mr. Dukes: Basically, the economics we have been looking at up until now have just been the sale of surplus power, not a parallel system.

Mr. Barnes: I would think it is fairer just to sell the surplus power at what is the true cost avoidance to Hydro.

Mr. Richmond: If this third turbine remains surplus to Dow's needs, would you consider selling or leasing the use of that unit to Ontario Hydro or the local municipal utility if power supplies in the Sarnia-Lambton area were falling short? You did mention you would have concerns over reliability. If you cannot do a deal, would you consider some arrangement like that?

Mr. Trask: We certainly would have nothing against selling the turbine.

Mr. Richmond: Or leasing its use?

Mr. Trask: The problem arises, who has the same demand? If Ontario Hydro is willing to pay for the hydro cost at 40 per cent energy efficiency, I am surprised that we cannot come to an arrangement where it would be willing to pay for 80 per cent energy efficiency, as we are recommending. Yes, we would sell the turbine. We have had offers on the turbine over the past year from the United States. We have just held back on that until we come to a conclusion as to what we are doing.

Mr. Richmond: If it were sold to the United States, it would be dismantled and shipped to the United States.

Mr. Trask: No, it could go as a unit.

Mr. Dukes: One of the things to remember about a gas turbine is that unless you can recover the waste heat from the exhaust, if it is in a boiler or something, the efficiency drops off considerably. It is in the order of the high 20s in percentage for efficiency of just using the gas to produce electricity, without utilizing that waste heat to produce steam and then maybe stepping down to produce more electricity.

Mr. Richmond: Therefore, it is probably only economic to run it at the same time as you need the steam for your chemical plant operations.

Mr. Dukes: From an economic point of view, yes.

Mr. Trask: That is the purpose of the combined cycle, to make use of the waste heat.

Mr. Dukes: Some of the plants in the United States use a simple cycle for peak load-chopping, but it is only for very short periods, because it is very expensive.

Mr. Trask: No, there is no question we will sell it. It is not going to sit there idle for ever and ever. There are people who would like to buy it.

Mr. Chairman: Thank you, Mr. Richmond. Mr. Trask, I guess that ends the period we have available. On behalf of the committee, I would like to thank you for preparing the submission for us and for coming in today and speaking to us about it.

Mr. Trask: It is certainly a pleasure to be here. Because we are such a major energy user, of course, we have a vital interest in what you are doing and wish you luck in all your deliberations as you try to come to a conclusion in your committee.

Mr. Chairman: Thank you. You have been a great help to us by coming in.

Mr. Trask: We have some copies, if anybody would like them.

Mr. Chairman: Perhaps you could give them to the clerk and she could mark them and distribute them as a part of your exhibit.

Our next witness is from Ontario Hydro. I am not sure exactly who is going to come forward first from Hydro.

ONTARIO HYDRO

Mr. Chairman: Welcome, gentlemen. Everyone has a chair? I hope everybody has access to a microphone as well. Our research department did prepare a summary of a number of the points we would like to go over. I am sure many will come up as we go over the next day and a half of discussions. Mr. McConnell, I suppose the best thing is just to start and run through these issues, if that is all right with you. I think it is the simplest way to proceed.

Mr. McConnell: That would be fine by us, Mr. Chairman.

Mr. Chairman: I think the members of the committee all have this, plus the background papers which were given out last night.

The first item we have identified is the question of the discount rate. Some witnesses have indicated that other utilities use a higher. I think we had some indication that, for instance, the Alberta energy commission was suggesting a 6.7 per cent discount rate. Some of the witnesses have indicated that a low discount rate would possibly tend to make us veer towards capital-intensive projects and away from other types. Some have also talked in terms of this discount rate compared to what consumers in the province have available to them, perhaps suggesting there may be some distortion in choices.

I think Hydro was present for most of those presentations, and I am just wondering what response you might have to that comment on the discount rate, whether you feel the discount rate Hydro uses should perhaps be a little higher and whether you feel some of the impacts the witnesses have suggested are accurate.

Mr. Rothman: This question of the discount rate is, as I think the committee has already seen, quite a complex one and one about which economists argue among themselves a great deal. To find that there is not any one clear answer should not be a surprise.

Let me try to break this out into a couple of questions. The first one is: Should Ontario Hydro use essentially a market discount rate, that is, one that reflects the actual cost of funds to Ontario Hydro; or should we use some social discount rate, that is, one that reflects costs of funds elsewhere in the economy?

The four per cent discount rate you have heard quoted and that Ontario Hydro has used–and Mr. Snelson can talk more about where that four per cent rate was used, but it is in at least part of this study–is a market discount rate; it is a forecast of a long-term market discount rate. It is essentially a forecast of roughly a 10 to 10.5 per cent long-term government bond rate less a forecast of about a 6 to 6.5 per cent inflation rate. Those were forecasts current as of 1985. That is roughly where that four per cent discount rate comes from.

1120

That is also looked at in a long-term sense. If we look over a very long period of time, eliminating the 1970s, which can be seen as something of an aberration, four per cent real discount rate is about what a long-term rate has been over a very long time. Looking at what the real market rates have been and what our forecast is for real market rates, that is where the four per cent comes from.

There is also a corporate financial discount rate; again, Mr. Snelson can tell you where it is used. That, too, is essentially a market rate, though with some adjustments. The corporate financial discount rate is a weighted rate. It weights the market costs of long-term debt by whatever its proportion is in the current financing package, but about 80 per cent, plus an imputed cost of equity capital weighted by whatever its proportion is in the current Ontario Hydro debt equity proportion, say, about 20 per cent. That produces the corporate financial discount rate. That is computed in nominal terms and is used for financial evaluation throughout the corporation.

That corporate financial discount rate is currently in the 10 to 11 per cent range and produces a real interest rate, current real corporate financial discount rate, in the 5.5 per cent range. Our forecast is that this falls by about one per cent per decade in real terms, getting to about 3.5 per cent after the year 2000.

Those are the rates that are currently used internally in nominal terms, and we impute our real discount rate simply by subtracting off the forecasted inflation rate from that.

The argument centres around, as I said, whether we should be using that or whether we should be using a social discount rate. Originally, many of the people who had been saying we should be using a social discount rate had computed or had estimates of the social discount rates that were very much higher than the rates I have just been talking about in the 4 to 4.5 up to 5.5 per cent range.

As one example, Glen Jenkins, who was an assistant deputy minister in the Department of Finance in Ottawa, has estimated an opportunity cost of capital, a social discount rate of about 10 per cent for public investment in Canada, and that would make a significant difference. What has happened in the years since that estimate was made is that successive estimates of the social discount rate have effectively been coming down for a number of reasons. Jenkins's estimate, for example, is considered to be too high because he underestimated the contribution of domestic savings and of funding from sources abroad in his calculation of the discount rate. He also overstated the rate of return on displaced private domestic investment.

You heard Professor Berkowitz yesterday, for example, say the evidence suggests there is no

crowding-out effect in terms of the capital markets, that Ontario Hydro's borrowing does not crowd private borrowers out of the borrowing market because of the way it is financed and because of the availability of finance in the capital markets. That is what Peter Spiro, who is an economist in my division, has also found. If you find that, you are going to compute a lower social discount rate if you take no crowding out than if you assume there is significant crowding out of private investment.

The closer we get to the current, the lower, in general, the discount rate estimates tend to be, actually. Although, as I say, it is still a significant argument, the degree of difference between the discount rate we use and the social discount rate has been declining. Peter Spiro's own estimate of the social discount rate is in the five to six per cent range. Again, that would be a discount rate you would use if you assume that there is crowding out, that Ontario Hydro investment displaces private investment and that this is the appropriate social opportunity cost of capital to use.

I think, though, that there is an argument to be made for using rates for Ontario Hydro that are close to the market rates, rates that are close to the rates at which Ontario Hydro actually can borrow. First, as I said, there is not a significant amount of crowding out and it does reflect the actual costs of the capital. Second, throughout this theoretical discussion, or recently in this theoretical discussion, it has been pointed out that there are some kinds of public investments that can promote private investment and technology development, so they should have lower than social rates of discount.

An obvious example is building a road. When you build the road, if you just do a straight cost benefit of the road itself, of the traffic on the road itself, you will ignore the fact that building a road tends to promote industrial and other development along that road. Building a road tends to induce private investment.

Similarly, what we have seen over a very long period of time is that growth in the capacity to supply electricity tends to promote growth, tends to promote technological development and private capital growth. That is not as strong as building roads, but it is certainly a strong argument for not unnecessarily biasing decisions against building electrical generating facilities. We can go into more detail about some of these arguments if you want, but I am just going to finish the starting remarks on that.

As I said, there are lots of different estimates around of the social discount rate. There are several different theories about how you should go about computing the social discount rate and we can talk about those if you like. Our bottom line is that we have been using a rate that is essentially market-based and that for several reasons this is not an unreasonable thing to do in the context of Ontario Hydro investments. Mr. Snelson may want to talk about how we use those rates.

Mr. Snelson: That is exactly right. I can give you a little information about the discount rates we have used, the sensitivities to those discount rates that we have examined, and some feel for which sorts of things are favoured by going with the higher discount rate and which sorts of things would be disfavoured by having a higher discount rate.

In the standard costing calculations that were done in phase 1 of the demand/supply options study, we assumed a four per cent real interest rate, which was the approximation at that time to the market-based, long-term rate that Mitch Rothman has been talking about. We looked at the sensitivity to a higher discount rate of six per cent real rate.

In the representative plan analysis, our base assumption was the corporate financial discount rate, which varies over time in the way that Mitch has described. We looked to sensitivity to discount rates two per cent higher or two per cent lower than the corporate financial rate.

The first comment I would make on the effect of that is that the degree of change in the rankings is not very large due to a two per cent change, which is quite substantial. You are talking about six per cent versus four per cent. so you are talking about a 50 per cent increase in the effective cost of capital.

The tendency of higher discount rates–if you were to go to a 10 per cent real rate, as has been suggested as one sensitivity–is that you would then have some significant effects. If you were to go to substantially higher discount rates, you would tend to discourage options where most of the cost is in the initial cost. These sorts of options are hydroelectric options; you would discourage hydroelectric options. You would tend to discourage nuclear options and many demand management options where the initial cost is an investment in more efficient machinery and equipment and you then impute a higher cost to that capital. Those are the things that would be discouraged by using a higher discount rate.

1130

You would tend to encourage options that have low initial costs and you may have to accept that they would have higher annual costs, such as fuel. That might include some natural gas options, including natural gas by cogeneration. You tend to encourage the options that do not require very much capital up front and you can discourage the options that do require quite a lot of upfront capital.

Mr. McGuigan: On your four per cent rate, I would like to see how you really justify that. If you go back to the 1970s, we had times when there was a sort of negative interest rate, a very high inflation rate and a low interest rate. I suppose that was made possible by the fact that starting in the early 1970s, governments virtually had very little debt. Up until about 1971 or something, Ontario had no debt and Canada had very little debt, but since that time all governments are loaded with debt to the point where people would argue they are bankrupt. You can make a pretty good argument to say that every government in North America is bankrupt.

As to the likelihood of that repeating itself, the likelihood of going through what I am saying was an aberration in the 1970s, I do not think the option is there and therefore in the future one could hardly expect to average in that period, as obviously you have done. You have averaged the 1970s in with the 1980s and said the long term was four per cent. I am wondering what your response is to that.

Mr. Rothman: If we went back and included the 1950s, the 1960s and the 1970s, I think we would get a long-term interest rate closer to three than to four per cent. The four per cent is a forecast and we really–let me start again.

I agree with you that the higher the level of government debt outstanding, the higher the level of the interest rate. Having government financial assets around tends to soak up savings. When people go to make decisions on how they plan to hold their assets, having that much government debt around tends to encourage people to hold more financial and fewer real assets. They buy more Canada savings bonds or they buy more government bonds all told, as opposed to buying real estate. That forces up the rate of interest and the real rate of return on those instruments.

I agree that the higher the level of government debt, the higher the real interest rate. In fact, our research–again, it is Peter Spiro's research–tends to show that the real rate of interest is more closely related to the level of government debt outstanding than it is to the current deficit. What drives it is what is available in the financial market, not what is moving up and down in the financial market, which is the current deficit. But our forecast really takes that into account. Essentially, we are saying that real interest rates are relatively high now, partly because of that phenomenon and partly because lenders are still uncertain about inflation in the future, which also tends to put real interest rates higher.

As we have more experience of lower inflation rates and as deficits come down as a fraction of gross national product, therefore the ratio of government debt to GNP would decline, and our forecast is that it will. Then we could expect that kind of pressure in the financial markets to lessen. So the four per cent forecast is a long-term forecast and does take that into account.

It is not really saying that is what has happened in the past; it is really saying that is what we are forecasting in the future. It is somewhat higher than the real interest rates we have actually experienced during periods of reasonable economic stability, like the 1950s and 1960s. The reason we forecast it will be higher is exactly the reason you have suggested, the high levels of government debt and continued fears of high inflation. You did not suggest the last one, but those are the reasons we forecast higher real interest rates for the foreseeable future than have obtained in the past in periods of reasonable economic stability.

Mr. McGuigan: I have to comment that you have more faith in the politicians than I have.

Mr. Rothman: We also have some faith in the people who make monetary policy decisions, and we think they have learned their lessons. That will help to keep some discipline.

Mr. McGuigan: I have been listening to promises on both sides of the border right now. It does not really give one much hope. At least, I suggest to you that it does not give the hope that you have. Of course, I agree that the monetary authorities do have the final word.

Mr. South: What was the percentage rate increase for Hydro last year?

Mr. Palmer: I think, on the average, it was 4.9 per cent.

Mr. South: That was higher than inflation then.

Mr. Palmer: I think that is right.

Mr. South: I think inflation averaged out at around 4.5 per cent. Over the last 10 years

would you say the rate increases have been higher than the inflation rate?

Mr. Palmer: Not generally. If you look over the 10-year period, you will find that the average increase in Hydro prices has been about equal to the inflation rate. There are some differences from year to year because we set the rate a year in advance; that is, at the start of the year, you do not know what the inflation rate will be until it actually happens. Retrospectively, you can compare the Hydro rate with the rate of inflation for that year. Sometimes we have been under and sometimes we have been over in that process.

Mr. Argue: I have two areas I would like to talk to you about. First, I would like to discuss the market discount rate; then we will move over to questions on the social discount rate.

Mr. Rothman, you suggested that this assumption was made in 1985 on the selection of the four per cent discount rate. I just want to reinforce what I believe you have answered, that you would not change that assumption if you were re-evaluating it today.

Mr. Rothman: Actually, I can show you the way that forecast was set up; that is, our forecast of long-term government bond rates from 1990 to 2025 was for rates of 9.5 per cent to 10 per cent and our forecast of consumer price index inflation rates during that period ranged from 5.5 per cent to 6.5 per cent. It was 5.5 per cent only for one five-year period, mostly six per cent and 6.5 per cent. That is really where that four per cent comes from. It is really those two forecasts. That is from our September 1985 long-term economic outlook.

We have a current, September 1988 long-term economic outlook. The forecast of government long-term bond rates there is in the 8.5 to 9.5 per cent range, and the forecast of long-term inflation is in the 4.5 to 5 per cent range. It comes out to be about the same, roughly the same four per cent in terms of a long-term, market real interest rate.

1140

Mr. Argue: Following up on Mr. McGuigan's question, there is a great deal of literature and discussion on exactly what is going to happen with both inflation and interest rates over the longer term. I would accept that the four per cent discount rate falls into the range people are discussing over the longer range. I would like your comments on your review of this. I suggest to you that based on questions of government debt generally, your choice of a four per cent discount rate is at the low end of what people are forecasting generally out in the market. My reading of the situation is that it is somewhere in the six to seven per cent range of forecasts.

I am wondering about your review of the literature. While four per cent does fall into that area, I would say it would be on the low side of what people are discussing with regard to discount rates over the longer term.

Mr. Rothman: I actually do not know where we are relative to others on that particular item. As you know, we review this long-term forecast annually with a group of outside forecasters, people who have both short- and long-term forecasting interests. We have representatives from consulting firms, banks, the Bank of Canada, the provincial government and the federal Treasury Board, and we have a full-day discussion with them.

I do not remember that any of them came at us on the discount rate. We had a lengthy discussion about the inflation rate and whether our inflation forecast was too high or too low. Of course, the Bank of Canada people said it was much too high and there were others who said it was much too low. I do not think–in fact, I know–that within that forum our discount, implied real interest rate came under criticism.

My guess is that we are in the middle of the range, although I really have not looked explicitly at that variable, that of us relative to the forecasting community.

Mr. Argue: Following up on the question of the social discount rate, I think it is of critical concern, more than the crowding-out question. It is one of ranking of options and making sure that with options undertaken by different interests–in this case, by some private-sector investments that will perhaps face a different environment than Ontario Hydro would–we are comparing those options on a social cost, equitable basis.

Mr. Snelson, you discussed the sensitivity tests you did on some of the options, and that it really did not change the ranking a great deal when you raised the rate to six per cent. I was wondering if you could perhaps comment and give us a couple of examples of what raising it to six per cent did to the standard costs for options such as nuclear and hydraulic, what sort of percentage changes it made and the differences in standard costs.

Mr. Snelson: I do not have the figures with me. I did look at them on the weekend. My recollection is that it certainly did not raise nuclear above coal; it narrowed the gap a little, but not a lot. It would have been in the order of a

15 to 20 per cent change, in that ballpark, on the standard cost.

Mr. Argue: Do you have any comments based on what a number of witnesses brought forward with regard to how we can compare options from a social perspective, given that a number of the options we are considering will be primarily promoted in the private sector, which will require different interest rate levels than Ontario Hydro can obtain, given that there will be some tax benefits and advantages to those sorts of developments? Do you have any comments on how we can make sure that options are compared equitably from a social cost perspective?

Mr. Snelson: I can make a comment with respect to the standard costing, because the standard costing was set up deliberately to compare options on an equal basis, whether they were owned by Ontario Hydro, whether they were a private generation option or whether they were a demand option where perhaps the equipment would be on the customer's premises.

Essentially, we ignored all ownership issues in the standard-costing calculation. All capital costs, whether they were our capital costs, the private generator's capital costs or a customer's capital costs, in all cases were evaluated using the four per cent real discount rate. That effectively valued private capital as equal in value to utility capital, and that was done to obtain a view across all options that was independent of differences among whose rate of capital one was looking at.

We were deliberately trying to avoid saying, "Capital is cheap to Ontario Hydro, therefore this option looks good; capital is expensive to a customer, therefore this option looks bad." We evaluated it on the basis that all capital was available at the utility rate.

Mr. Argue: But we have moved beyond the question of ranking of options and the consideration of those options. My question concerns implementation of the options rather than the rankings, because there were several other items I do not think we need to get into at this time that come into consideration on standard cost. My question specifically is on implementation questions.

Mr. Snelson: Okay. Let me give you an example of the sort of thing that is being done on implementation that is addressing this issue.

In our detailed negotiations of private power purchase for large independent generators, large nonutility generators–and I have in mind two particular projects in northwestern Ontario–Ontario Hydro is making capital available to the private generator and is arranging for a payback of that loan.

It is arranged as a loan, but so that the initial interest rate on that loan is very low and the capital repayments on that loan are deferred until the latter half of the contract, so that the private generator will see a higher return on initial investment than if he put up all the money himself. This is one way of helping to transfer to the independent generator the benefit of the availability of capital that is seen by Ontario Hydro, which may be better than is seen by the independent generator.

The same sort of argument would be applied in making incentives available for demand management, although we are perhaps not quite so far along there. Part of the rationale for making incentives available is so that the customer can see a higher rate of return on his capital than if he were just to make the investment himself to reduce his electricity bill.

Mr. Argue: We will get back to that specific issue a little bit later on the parallel generation side of the issue.

1150

Mr. Charlton: Just very briefly, because I know the chairman wants to move on, my question is to Mr. Snelson with regard to this whole approach to looking at sensitivities in your analysis. I assume the starting point is that you have developed a set of assumptions that make up the standard cost that Hydro thinks is the correct standard cost, and the sensitivities are strictly in terms of the variations that somebody out there suggests may be possible.

Mr. Snelson: When we go into justifying expenses in Ontario Hydro, that is a pretty difficult task. We have to work with the most likely estimates that the corporation has produced for inflation–discount rates, the cost of nuclear fuel and so on–and we have to demonstrate to the satisfaction of our controllers and our management that we have looked at a wide enough range of sensitivities that the judgement can be made as to whether a given investment is sound.

We look at quite a wide range of sensitivities. In the demand/supply planning strategy document, for those particular studies a given range of sensitivities was looked at. That was for a very broad, encompassing study. When you come down to a specific decision, you may very well find that the sensitivities that have been looked at are wider, because you have more time, if you concentrate on a specific decision, to look at a wider range of sensitivities.

A reasonable range of sensitivities was looked at in the DSPS studies. That does not mean to say that when we come to make the individual decisions, we will not look at wider ranges. Our nuclear fossil comparison report, for instance, looks at wider ranges of sensitivities than are in the DSPS document. It is a tradeoff. You want to make a sensitivity test wide enough that it is credible, that it is something that bothers people, that they want to look at; but you only have a certain amount of study, effort and time to invest in any particular study. We have a limited number of people to do these things, so we do not want to do a lot of tests that go beyond the reasonable range. There is a lot of judgement in choosing.

Mr. Charlton: Just to follow that up, I am not sure if it was really implied in your answer to Mr. Argue earlier, but when you said, "I had a look at those figures on the weekend and my recollection says that..." you seemed to imply that when you are doing these sensitivities as a variation from Hydro's view of what the right standard cost is, you are doing them one at a time and independently.

In other words, you said, "Yes, we went down to..." and I think you said what the low figure was in terms of the discount rate and that it went up to six per cent at the high end, and at six per cent there was a reduction in the gap but it was not significant.

Mr. Snelson: You have to consider whether the test you are making is reasonable. If we are testing the sensitivity to change in the value of capital to Ontario Hydro, then if I was to assume that capital cost six per cent instead of four or five per cent for a nuclear plant, I would make the same assumption for a fossil plant because there is no reason why those assumptions should be different. I would compare the higher-cost nuclear plant with the higher-cost fossil plant, because there is no reason to assume that the cost of capital to Ontario Hydro would be different according to what we are building.

If I am looking at a sensitivity to capital costs, it might make a lot of sense to compare the sensitivity–what if the nuclear plant costs 20 per cent more–with the base case estimate for the fossil plant, because there are things that can affect the cost of the nuclear plant that might not affect the cost of the fossil plant. So you have to make the right sorts of comparisons according to what you are testing.

Mr. Charlton: Okay, but what I was getting at is that there are other sensitivities you look at besides just the capital cost sensitivity. In your answer you seem to imply that you have looked at the capital cost sensitivity by itself.

When you are doing these sensitivity tests, do you take the whole range of sensitivities and plug them all into a model which cumulatively could have a significant difference in the way the gap changes? For example, if you end up with changing four or five assumptions in your sensitivity tests that make the picture look quite different, do you then go back and re-evaluate to look more closely at that question?

For example, We have had before this committee and during our hearings not only people coming in and saying they think the discount rate that Hydro is using is too low, but also people saying a number of other things in terms of other assumptions in the cost comparisons between a number of the alternatives, in terms of coal prices, in terms of gas prices, in terms of a number of other items that make up parts of the standard cost.

Mr. Snelson: I want to de-emphasize the standard cost. The standard cost was used for ranking. The decision-making is done on an evolving basis as each decision has to be made. For instance, you will notice that we have recently released an environmental assessment document on Little Jackfish, which is another stage along the way. We have to do a detailed financial evaluation of the Little Jackfish project to justify the continuing expenditures on that project. Don't let's get too much hung up on the standard cost. The actual decision-making is made on a detailed case-by-case financial evaluation. It is very thorough.

You can look at several sensitivities taken together. You have to ask yourself how reasonable it is to assume that all things go in one direction at the same time; that the cost of capital goes up, the cost of fuel goes up and the cost of something else, and it all goes in one particular direction. It is not inconceivable that the probabilities get to be quite small, and if you are taking a balanced view, you should also be looking at the sensitivities: what if everything goes in favour of your particular project, what happens if the things turn out more favourable, if the interest rate turns out to be less in real terms than you thought or the fuel cost that you compare it with goes up.

Let us take nuclear as an example. If the cost of coal escalates more rapidly than you expect, then probably a nuclear plant will look more attractive than it would otherwise.

Mr. Charlton: Yes. I think, for example, our concern at this point is around the question of ranking.

Mr. Chairman: If I could interrupt, Mr. Charlton, I need to adjourn the committee at 12 noon, I am afraid. There are some caucus commitments for most of the members. Could we pick up with questioning at two o'clock?

Mr. Charlton: Certainly.

The committee recessed at 12 noon.

AFTERNOON SITTING

The committee resumed at 2:18 p.m. in room 228.

ONTARIO HYDRO
(continued)

Mr. Chairman: Could I call the afternoon session to order, please? Unfortunately, we are starting just a little bit later than we might have liked to.

I thought that before we go on I should just lay out what I hope will be the schedule for the next couple of days. We have a number of issues that the committee would like to discuss, and I would propose to continue that this afternoon until about five o'clock, and then tomorrow morning and perhaps for the first hour of the afternoon session from two until three tomorrow. At three o'clock, I understand, Mr. McConnell, you would like to make a sort of wrapup statement.

Mr. McConnell: Yes.

Mr. Chairman: Then Mr. Franklin will be here at about four o'clock. I would propose to carry tomorrow's session until about five o'clock, if that is agreeable to the committee. Okay.

Mr. Charlton, I believe I cut you off in mid-stream. Did you have any further comments or questions?

Mr. Charlton: Yes. Just before we broke for lunch, I had raised the question of multifaceted sensitivity checking. Earlier this morning, Mr. Argue asked a question about whether or not the four per cent discount rate you are using was at the low end of the range of predictions in terms of what will happen with interest rates. The answer we got was, "We don't know."

We had a number of presentations during the course of our hearings that essentially challenge a number of the assumptions you have used in some of the scenarios. For example, in terms of gas prices, not only did you use gas prices that were at the high end of the range, but they were also well above the predictions that we were presented with by people like the Department of Energy, Mines and Resources, the provincial Ministry of Energy and the National Energy Board.

Mr. McConnell: We will be making some presentations on gas prices.

Mr. Charlton: I do not want to get into the gas prices question now. I am just using it as an example of why I am asking the question about multifaceted sensitivity checking when you are looking at your scenarios as opposed to doing the sensitivities one at a time, because although one sensitivity check may not change the ranking, looking at several in combination may in fact change the ranking. The concern that has been put to this committee and what this committee has to get to the bottom of is exactly what was expressed to us just before lunch: If we start this process of doing sensitivity checking in a multifaceted way, is it reasonable to assume that everything is going in one direction? I think that is how you put it, Mr. Snelson.

There are those who would say that that is exactly what you have already done, that you have it all going one way. Some of the presentations we have had before this committee have said that Hydro has weighted things in a fashion that creates the answer it wants. That is what a number of our presenters have said to us. This committee has to determine whether that is the case or whether what you have done is reasonable. We have to look at the whole package of things, and my question related specifically to multifaceted sensitivity checks.

My understanding is that they have not been done, and I question why they have not been done, especially in light of the examples that were put to this committee, which showed that when you do that and change some of the assumptions–whether the assumptions are correct is another question–you can come up with a different answer in terms of the ranking of one option versus another. Why would Hydro not do at least that kind of multifaceted checking and do more serious follow-up when you find those kinds of things happening?

Mr. Snelson: First, you have raised the question about whether our central estimates are the most probable. I think that is the core of this real question more than the multifaceted sensitivity, because our position very strongly is that when we make an estimate of something, we are not biasing it to one side; we are making our best estimate, which can deviate in either direction. We have at times done something along the lines you suggest in terms of multifaceted sensitivity analysis.

If you take a deviation in one direction which, say, has a 10 per cent probability of being exceeded in one variable and if we assume that another variable also goes the same direction and maybe also has a 10 per cent probability, the

probability of the two things happening together, if they are independent, is only one per cent. So you start to compound one on top of another and you get to very low probabilities.

Now, we have tried that sort of analysis, and it is pretty difficult because putting the probabilities on these deviations is quite difficult and estimating whether they are independent is even more difficult. So we have tried to do that sort of analysis, but it gets to be quite difficult.

Mr. Charlton: I do not disagree with your analysis at all in terms of the probabilities of, on the one hand, the low end of economic predictions about interest rates being what actually happened and the high end of the gas price range being what happened, both at the same time. But, in essence, what we are being told is that those are the kinds of things you have used in your baseline analysis. That is where the questions come from. The sensitivity work you have done above and below the basic number you have used is being questioned.

Mr. Snelson: We will be using different numbers in our preparation of definitive plans, which will be the best estimates available at the time we do that analysis. As we sit now, it looks as if the gas prices we will be using at that time will be quite different from the gas prices we were using in 1985, when we did the standard costing analysis. There is no doubt that we will shift to the best estimates we have available at the time we do the analysis.

Mr. Charlton: I guess the committee's concern is that, to some extent, the numbers you used in the 1985 analysis pushed some options to the fringe, where nothing further is likely to happen with them because of the relative ranking they ended up with.

Mr. McConnell: I do not think so, in terms of your citing a specific that has been rejected from our strategy. If you are implying gas, that is incorrect. It is still in our strategy.

Mr. Charlton: No, I was not. I guess what I was saying is that–

Mr. McConnell: I do not know that you can cite a specific that we have rejected on the basis of interest.

Mr. Charlton: No, I did not say rejected in the sense of what is in the strategy now; I said it has been pushed to the fringe in relative ranking. You have options that have been pushed to the fringe, and they get pursued in a different way. Nobody can tell me that if you have a list of rankings from best to worst based on the analysis you have already done, what appears to be, from the initial analysis, the worst option is going to get the same kind of consideration as what appears to be the best option is going to get.

Mr. McConnell: Yes, but the first question was focusing specifically on the question of the discount rate, which Mr. Rothman has attempted to deal with. Of course, he had to get into this philosophical question about what will show up to our customers in terms of real cost and real interest rate, which brings you into the focus in terms of the four per cent arena and the broad philosophical question about social discount rates.

Setting that aside for the moment, when you talk about Ontario Hydro having a bias in terms of the real discount rate, taking into account the context in which Mr. Rothman described that, I would remind you that, as Mr. Snelson says, we are trying to be in the centre of what we expect in the future, and historically I think you will find, if anything, that the four per cent is on the high side. I think we should be very fair.

Mr. Charlton: I understand that. As I said, though, when the question was asked this morning about whether the four per cent discount rate was in the centre or at the low end of the predictions out there in the real world, the answer was, "We don't know."

Mr. McConnell: No. The question that was asked was a comparison having to do with other estimators, and Mr. Rothman responded to that; but on the other hand, Mr. Snelson had said the numbers we are using for discount rate are, to the best of our knowledge, in that 50 per cent chance of being higher or lower, in spirit.

Mr. Charlton: That still does not deal with the question I asked. My question was elicited by Mr. Snelson's response to a question by, I believe, Mr. Argue, when he responded, "When we did the sensitivity analysis on the discount rate at six per cent, it narrowed the gap a little, but not significantly." Whether or not you are right about what the discount rate should be, this committee has the responsibility to look at that question.

You have been challenged in terms of whether it is right or not, so the one thing we are asking you to do is to justify the discount rate you have used. We will also ask you at some point to justify the gas prices you use and so on and so forth down the list. I understand we have to go through that.

My question was, do you do multisensitivity analysis, because if you just say, "Discount rate reduced the gap, but it didn't change the ranking," and you set that independently aside

and say, "Gas price reduced the gap, but it didn't change the ranking," and then you set that one aside and then you say, "This item, when changed, reduced the gap, but it didn't change the ranking," what happens when you take the three in combination, and do we have something we should be pursuing?

Mr. McConnell: Mr. Snelson has said that yes, we do such analysis, but not exhaustively. That is to say, we do it to the degree that it is relevant for the decision that is being made. It is very difficult to say that you are doing multifaceted analyses for everything all the time. We could give you examples of such analyses that we have done in the past.

But when it comes right down to a specific planning decision, Mr. Snelson was also saying that it is at that particular instant in time when you go to recommend a specific decision that you expect that all the devil's advocates will emerge simultaneously and you will have to be able to answer every sensitivity question that you can possibly think of: What if this? What if that? What if this plus this? Then we take the rifle out and we do the more complete sensitivity analysis at that particular time. When you are doing the board evaluations, you have to put some boundary limits around the amount of sensitivity analysis that you do.

1430

Mrs. Sullivan: I want to follow further on Mr. Charlton's questioning. When you did the standard cost analysis for 1985, did you, at that time, also do the present value evaluation? Is that a concurrent process?

Mr. Snelson: The standard cost calculation has elements of present valuing built into it, which used the four per cent real discount rate, as we have discussed. The representative plan analysis was done somewhat later, using data that were current at that time.

Mrs. Sullivan: Because of the current situation, whether economic or because of other assumptions that are current at the time, the options that appear to be in priority positioning in 1985, by example, and that are perhaps in different positioning now, would ultimately change when you are into the final planning period.

Mr. Snelson: It is correct that we will use the most recent data available in the planning period, and that will have some effect on which options are selected, I am sure.

Mrs. Sullivan: So over that time, as you move in time, there is a fluidity in the option selection.

Mr. Snelson: That is inevitable in all our planning processes. We are working with a continually moving set of data, and you are always in the position of making a decision with the best data that you have available today.

Mr. McConnell: I think it is fair to say that, as time goes by, you get to recognize the data which tend to be most fluid. You find that, for some options, the data tend to be fairly stable and you do not find yourself rapidly changing gears every two or three years; but for other data, you find yourself in the very difficult position that you are adjusting your data, both your short-range and your long-range points of view. That makes the decision of the day somewhat vulnerable to the best judgements you can put together that day.

When we come forward with the plan next year, we will be using 1989 data, we will not be using 1985 data, and some of those data will be significantly different from what was used in the representative plan analysis.

Mrs. Sullivan: Thank you.

Mr. Chairman: We can then move on to the next set of questions under the demand and supply strategies. I think the next four points really come down to the same thing, which is more or less figure 8.1 on the various lifetime energy costs. Based on some of the evidence and some of the witnesses who have come forward, there was a bit of question as to the gas cost, perhaps some of the assumptions on coal and what not. The thrust of these questions really is that we would like to review with you perhaps how you came up with those costs, whether you consulted groups such as the natural gas association or the coal association in arriving at costs for those various fuels, I guess coming down to the point of whether, on the basis of things that have come up since this chart was done, you might be thinking of adjusting any of the various costs that are set out in figure 8.1.

Mr. Marriage: Maybe I can start with this series of questions. What I would like to do is just give a few points about estimates and then review the process. Then we can move into some of the specifics in terms of the gas and some of the other options.

Very quickly, the estimates will vary in type and in the extent of the work we do in putting them together. We can have study estimates, which are basically used for screening, as was the case in the first phase of the demand/supply options study. These are primarily based on office study data, past experience, consultants' reports and other externally available information.

We also have what we call release estimates, which we use in detailed evaluations of plans and projects when we are seeking authorization for construction for implementation. These, of course, require a lot more information and are based on field investigations, environmental studies, site drilling, tendering, preliminary engineering–much higher quality, of course, for the decision they are being used for.

We feel that our estimates are both comprehensive and well founded, and I will try to illustrate that by touching on the process. The planning groups, such as system planning, specify the option requirements in terms of timing, location, operating characteristics, incorporation and a number of the other aspects.

In requesting the information, we look at the full life-cycle costs of these options. This includes both the social and environmental requirements, which were identified in one of our strategy elements, 2.1.2. This full life-cycle cost includes the design, construction and acquisition of the capital facilities, environmental mitigation, incorporating transmission. It would look at fuel costs, heavy water costs for nuclear power, operating and maintenance and administration costs, waste disposal and decommissioning costs. We would be getting the costs through the full cycle of the option.

The specifications for this are reviewed with the groups responsible for the estimating, these being the design and construction groups, the energy management branch for demand management, fuels and the operating groups. We then finalize those specifications and issue them to the groups that are responsible for the estimates. Of course, we have information in terms of the escalation and discount rates provided by Mitch Rothman's people and the controllers.

The people making the estimates, whether they be the fuels people, the design and construction people on supply or the energy management on demand-reducing options, use a number of sources and have a number of contacts in preparing these estimates. Of course, they use our own Hydro experience and database from past projects; preliminary design; test demonstrations; information on our supply contracts; supplier and consultant pricing information; other utility experience and data; external forecasting agencies and, of course, judgement of qualified staff in the estimating business.

So we certainly feel that we do a comprehensive job. We try to get the best estimates from all of the information available, and there are a number of contacts by the estimating people with outside sources.

Maybe that is the place to stop in terms of a brief outline of the process we go through. As for more detailed questions on these, we will be presenting some information on the gas in relation to your question on that and the coal.

Mr. Chairman: Could we have that now, then?

1440

Mr. Rothman: I would like to use the projector for part of this discussion.

One of the questions that has arisen in terms of the gas price forecast has arisen, I think, because of the timing. Our gas price forecasts, along with all of our forecasts, are done in a really very open and consultative process. As I mentioned this morning, every time we do a long-range forecast we have a session with forecasters from outside Ontario Hydro. Every time we do a long-range load forecast we similarly have a full-based session with forecasters from outside Hydro.

These include forecasters from the gas companies and from the oil companies. There is typically one each from the gas company and from the oil company. For the load forecasts we have people from Energy, Mines and Resources. We have people from the National Energy Board. We have people from the Ministry of Energy. For the load forecasts we have people from the two federal agencies. We invite people from Hydro-Québec. We get as wide a range of forecasters outside Ontario Hydro as we can. These forecasts are reviewed. We are not at all out of contact with the community.

In 1985, which is the time we made the forecast that is being quoted to you, we were well within the range of the forecasts available from other agencies. DRI and Enerdata are private consulting firms. We subscribe to both of them. Ontario Hydro is the red line. The two lower blue lines are the Ministry of Energy and Consumers' Gas.

Our 1985 forecast, which is the forecast that is shown in the data you have been quoted, was quite in line with forecasts made at the same time. If we take our current forecast–and what you have had compared was our 1985 forecast, actually, with forecasts made recently–if we look at our current forecast, once again we are well within the range. Certainly up until the mid-1990s we are, as you can see, well within the range of this group of forecasters, which includes Consumers' Gas as well as some external consultants and the federal department of Energy Mines and Resources.

We have a slightly faster escalation in the 1990s than do some of these other forecasters, so we wind up just slightly above their forecast by the year 2000. Our forecasts are certainly not out of the range of these other gas price forecasts. I can also show the same kind of thing with a table which gives you some indication of the dates of those forecasts and what other variables were around.

In October 1985, which is the date of the forecasts you have been quoted, oil was selling internationally for US$26.70 a barrel and in Canada for $39 a barrel, natural gas for roughly $4 a million BTU or a million cubic feet. Our forecasts for 1988 then were $4.50 per million cubic feet, escalating to $13.50 in the year 2000.

This is the Toronto city gate price. The $5.08 that you have been quoted is consistent with that $4.55 Toronto city gate price, on the assumption that, in a time when energy prices were high and oil prices were high, prices for bulk generation and bulk supplies for generation would likely be higher on a long-term contract basis than the price for retail delivery of relatively small amounts on relatively shorter terms. That is where the $5.08 that you have been quoted comes from. It comes from this $4.55 forecast made at a time when oil prices in Canada were $39 a barrel.

If we now go to the time of August 1988, on this forecast that you saw from the Ontario Natural Gas Association, we have oil selling for $15.50 a barrel internationally, or in Canada for about half the price that was previously quoted. Of course, the gas price forecast is significantly lower; so is ours. This is our current gas price forecast here, at $3.35 per one million cubic feet or one million BTUs. You will see that we are again within the range of the forecasts shown there, both now and for the future forecasts. I do not think there is a serious difference between our gas price forecast and those of others. Of course, the price forecast we would use for any evaluations we would do in the future would be in line with that forecast.

I can talk briefly about the coal price forecast. This is, again, a history of the coal price forecasts for price per ton in the year 2000 for various grades or kinds of coal Ontario Hydro might buy. Once again, it is the same story. In the fall of 1984, oil prices were high, gas prices were high and you would expect coal prices to be high. Again, our current forecast is for coal prices to be a good deal lower than we had been forecasting even three years ago.

Our forecast was made in late 1985. Even just going back briefly to the previous chart, you can see that, from October 1985 to October 1986, the then current gas prices had fallen by about half. If you take our own 1986 forecast, it too would be significantly lower, and the same kind of thing has happened in the coal price forecast.

I do not, unfortunately, have copies with me right now of these tables and charts, but I can certainly get them. I can give you these originals, but the colour originals will not duplicate as well in black and white for the gas price chart. Later we will get you originals that will duplicate better for black and white.

Mr. McConnell: I think everyone here knows that the ability for us to forecast oil prices in this world is not very good. We have been able to forecast hydraulic prices well and we can forecast nuclear prices well; but when it comes to oil, the one thing we can be sure of is that our estimates five years from now will be different from what they are today. Forecasting the price of oil, which is a world commodity, is a very uncertain business.

When it comes to the gas price, I would be extremely surprised if the price of oil went up and the price of gas did not go up with it. There is a bit of a lag. What we are really saying to you is that what has happened in the last three years is fundamentally one of the points we are making: there is a great deal of risk for this province to depend on fossil prices over the long term–say, 40 years–whether they be oil or gas.

With regard to coal, I think we have more confidence because of the extensive deposits of coal that exist in North America. However, we are still vulnerable to the point I mentioned in our early presentations: that all our coal comes from outside of this province; it is not indigenous, and therefore we are vulnerable to some degree on the uncertainty of coal prices as well.

Mr. Chairman: Would the fact that it appears the prices now in place in 1988 are lower for both gas and coal than in 1985 make a difference to this figure 8.1, where you have talked about the cost of some of the options?

Mr. McConnell: In terms of the strategy we presented, it does not make any difference to the strategy. In our opening chapter, when we filed this, we had indicated that we had not gone back and redone all of the estimates of the studies in 1984, 1985, 1986 and so on, but we made a statement that we felt our strategy was robust enough that it accommodated those kinds of changes that occur over time.

1450

As far as coal and oil and gas were concerned, our strategy did not rule those out. They are still embraced in the strategy. In our presentations to you in early August, we specifically identified the merits of why we had said that we wanted to maintain an up-to-date technology with regard to what we call the shorter options in time that would provide us flexibility to meet an upper load growth.

We talked to you about such things as starting off with gas on a cycle that would in the longer term be switchable to coal gasification but would start off using gas. If we found ourselves in that position, what we could do would be to move to gas quickly. If we then found we really did not like what was happening to the price of gas, we could switch over to the coal gasification.

We presented those cycles to you in our early August presentations. We do not see that these changes in prices in any way change our strategy.

Mr. Chairman: I just wondered, in terms of some of the forecasts over there, given that we have heard it is possible to lock up gas for 20 years at some of the prices available today and perhaps avoid some of the escalations, would some of the estimates of the potential for gas or some of these other sources of power be shifting, or would you feel there might be a different number attached than what you have laid out in the strategy here?

Mr. McConnell: Yes, I think the decisions of the day would be affected by the knowledge of the day. If you have lower prices of the day and you have lower forecasts that day, that will tend to make the recommendation somewhat different. It does not get rid of the uncertainty that is associated with the fossil options.

I guess that perhaps the major example of the long-term business that we are in is that I think everybody here is aware that for the vast majority of factories and commercial buildings that are built, people like to get a return on their investment, generally, in much less than 10 years. In the power business, whether it is public or private enterprise, we have very long-time horizons. Those hydraulic stations that were designed in 1896 and taken over by Ontario Hydro in 1906 are still running in 1988.

We have great concern about suggestions of moving interest rates up to numbers that are considerably higher. For example, if you move the interest rates up to six or seven per cent, you are really eliminating the hydraulic option. This has sort of been the stalwart of Ontario Hydro over the many decades. I am not too sure that is what you want to do. Certainly if you raise your interest rates, that is the one you are going to hit the hardest, because it is very marginally economic now.

We do, nevertheless, do these sensitivity studies, but our position is that these numbers, to the best of our knowledge, are in the centre of our expectations and that in that particular area we have been off in many numbers in the past, but in terms of the interest rate, we have tended to hover around the centre point.

Mr. Chairman: Are there questions from the committee on any of these points?

Mr. McGuigan: I am not a great proponent of coal, for the obvious reason of the environment. I guess I have reason to be sensitive about that because the drought we have experienced in the last two years hits the southwestern corner of the province worse than it does the bulk of the province. We start from a lower base. We have about four inches less rain historically than the rest of the province, so when we get a drought, we are starting at quite a handicap. But it ties into the movement of grain from western Canada. Ignoring the fact that they also have droughts, and perhaps the greenhouse effect, more and more grain is being shipped from Vancouver and less and less from the Lakehead. People are very worried about that.

Does that open up the possibility that more coal could be shipped from Alberta and at a cheaper rate than in the past? You can perhaps make use of some of the rolling stock that you are now using for grain and so on. Have you looked at that possibility?

Mr. McConnell: We do not have here in our team today any persons who are expert in the area of travelling rail stock so that we could answer that question, but my guess offhand is that I doubt there would be a major reduction in the price of coal delivered to southern Ontario because of that grain shipment, but certainly we can ask that question and send along an answer to you.

Is there anyone who feels he can answer the question? I did not think so.

Mr. McGuigan: Thank you very much.

Mr. Charlton: I do not fully understand what you are saying to us when you say that the changes in prices between the time you did the analysis and the present time do not affect the strategy at all. I think I understand, in part, what you are saying, but I do not fully understand that.

Mr. McConnell: We had 52 strategy elements and we went through those 52 strategy elements

with you. When we recognized that this study, for a number of reasons, had been extended to a four-year time interval, we became very worried whether the crude screening analysis that we had done in 1985 was still valid and the representative plan analysis, which we had done largely in 1986 and early 1987, was still meaningful. By taking a look at the data that we had on board in November 1987, just prior to issuing this document in December 1987, we examined those 52 strategy elements and asked, "Would this new data have changed the strategy?"

If it did, we then could have also criticized ourselves, because we said at the outset that we think data are going to change every year. If we have a good strategy, it should not be sensitive to the data that are changing from year to year. In fact, that would be a good example that we had a bum strategy, if the strategy went kiboshed immediately when we started to change the data. A good strategy is something that will survive with changing data. We found that the strategy was not affected and we so declared in the front end of the document.

Mr. Argue: I have a brief supplementary. Perhaps Mr. Snelson can answer this. Why then were there some adjustments? I am referring to the supplementary document. The principal supplementary document to the DSPS makes adjustments to the nuclear cost estimates. Those were prepared in 1986 and early 1987. For some of the nuclear options, you made adjustments on those capital costs when, as Mr. Rothman has presented it, there were new forecasts available in 1986. Were those changes not integrated into the representative plans and the consideration of options?

1500

Most of the data were fixed in 1985. Data from 1985 were used in the development of the strategy, but some of the data were adjusted in 1986. I am wondering why some were adjusted and others were not, based on that new information.

Mr. Snelson: I do not have a specific answer for that other than that at the time we did the representative plan analysis, we would only have changed data which we knew had changed. As for the nuclear costs, what we were talking about, the standard cost data are presented in here the same as they were in the original document. We changed some words that went around it to acknowledge the fact that we knew oil and gas prices had been shifting, even as we issued this document. We did not change the analysis. In the representative plans, I cannot specifically answer whether the nuclear costs were changed and if so, why. We would have been using the best data we had available at that time.

Mr. Marriage: That is my recollection as well, that for the data we used in the representative plans for those options there, we went back and used the best data we had at that time, as opposed to sticking with what was used in 1985 standard costs.

Mr. Charlton: Again, you will have to pardon my confusion. We have had some criticism of the DSPS document, because some of it is strategy elements and some of it is beyond strategy into the question of more specific data planning. We have had some discussions around that already. There are a couple of aspects of this thing, in relation to its being a strategy, with which I have some difficulty. For example, you keep referring to is as a strategy document, but it is a strategy document that in one of the later chapters says something like, "We've got to maintain the nuclear industry in a viable state."

That is a fairly vague comment, and I will have some questions later about just exactly what you mean by that statement. I do not want to get into that definition now, but that statement in a strategy document can, to some extent, be justified by some of the analysis that has been done where you end up with enough numbers left in your forecast perhaps to justify another nuclear plant.

On the other hand, if we start doing some of the further analysis with some of the new numbers–in terms of prices, it seems to me, for example, as your charts showed, the gas price is down by a third from the numbers that were used in your analysis–then that is likely going to change numbers in terms of how much industrial cogeneration might be available and how much parallel generation might be available. If you do not, at some point in this process of developing your strategic approach, if that is what we are doing, you are going to end up with a situation where, instead of having 4,000 megawatts for which you are looking for a supply option, you may have only 1,000.

It seems to me in that scenario the decisions about what that supply option is going to be will be quite different for 1,000 megawatts than they would be for 4,000 megawatts. In that context, I cannot understand, just from what I have seen in the document, how you can say to us that the numbers do not make any difference to the strategy.

Mr. McConnell: You have just cited a specific example in which there was a fairly

dramatic change in the price of oil between 1985 and 1987 or 1988. That is true. There was also a fairly dramatic change in which the gas price followed it. I have suggested earlier this afternoon, if the price of oil went back up again, you would find that the gas price would be following.

Setting that aside, we were aware in percentage terms, as far as nonutility generation was concerned, the maximum opportunity economically in Ontario was where major industry or major commerce was a natural consumer of major steam. That provided the opportunities for an efficient process using cogeneration. We also were aware that gas was likely to be the primary fuel that would be associated with that cogeneration. We presented data to you in 1985-86 of some 335 megawatts of expectation at that particular time.

Certainly, when the price of gas changed dramatically, that did make the competition more effective with cogeneration and the number of 1,000 megawatts which we are using now did not affect the basic strategy. It did not matter whether we used 335 or whether we used 1,000, when we examined the numerical data, the conclusions in terms of the strategy statements were still the same.

Mr. Charlton: What you are telling me is that the 1,000 megawatts of cogeneration that you are talking about in the strategy are not based on 1985 numbers, but they are based on some other numbers.

Mr. McConnell: No. The 1,000 megawatts is a number we issued in 1988.

Mr. Charlton: Before you did the cost reanalysis.

Mr. McConnell: No. We were aware that the prices of gas had gone down by last year.

Mr. Charlton: You started to run the scenarios with the new prices?

Mr. McConnell: We were not only doing that, but we were actually out there trying to promote the NUG and so we had real deals and real negotiations going on last year and we had a better feel of what those kinds of gas prices were likely to bring us.

Mr. Charlton: If you have run scenarios with the lower gas prices, it would certainly help us if we could see those, because we have not. All we have are the scenarios with the high prices in them.

Mr. McConnell: We did not repeat the demand-supply analysis, I do not think.

Mr. Snelson: What we have done and what we do on a continuing basis is a series of evaluations. Sometimes there will be an evaluation done of the nuclear fossil comparison or this comparison with oil. The sum total of all of these evaluations is the knowledge that there is within Hydro about planning for various options. On that basis, you start to make individual decisions and you start to adjust particular estimates.

Mr. Charlton: If you have not rerun the scenarios with the new gas prices in them, how do you know how much cogeneration or parallel generation with combined cycle gas there is going to be at that price? What is the 1,000 estimate based on?

Mr. Snelson: The 1,000 estimate is based on an estimate of the potential in terms of the amount of steam use there is out there and high-pressure steam systems that could utilize cogeneration. That is independent of the price of gas. The second thing it is based on is judgements based on analysis. There are many documents produced for us and for the Ministry of Energy that have addressed the issue of how much of that cogeneration will become economic. In the strategy document, we said that the potential, the quantity, was somewhere between 300 and 1,000. At the time that we did the analysis, we thought it was more likely to be 300. The shift that has taken place is that with the lower gas prices and the increased interest that has been shown in cogeneration, we think we are getting towards the upper end of that estimate. That is why we changed it.

Mr. McConnell: There were concurrently other changes that went on simultaneously. For example, much more dramatically we had to move our load forecasts up because of the large load increase that has occurred during the last five years. That is not the only parameter that we looked at when we looked at the robustness of our strategy. There were a number of other things. At any rate, we were reassured that with all of these changes in data that the strategy still seemed to make sense.

1510

Mr. Penn: Before we leave this subject of cost estimates, there is one area that I would like the committee to be familiar with that we have not touched on, and that is the design and construction costs which often, in many options, are a major part, if not the major part, of the lifetime costs which you referred to in the ranges shown in figure 8.1.

I want the committee to understand that when my group–and I am responsible for the design and construction cost area–receives the specifi

cation of what is required in its total terms of reliability, where it is, how much output, when it has to be in service and many other things, we look at the required schedule for the undertaking.

We have a very large data bank of information on all supply options which we have put together over years of experience of our own undertakings, data which we get from other major utilities in the world, including the electric utilities cost group in the United States, which is extremely detailed in terms of labour rates and labour for every component in a plant, and the cost on a schedule classification index, as we call it, which is a very regimented process of ensuring that every piece of equipment and every process is accounted for.

We have to know, of course, in estimating how we are going to put the plant together, what the detailed schedule is because, obviously, this affects cost. Our costs must include the cost of acquiring the site if we do not already have it, the cost of gaining the approvals for the undertaking in all its extent, both environmentally and socially, the cost of the pre-engineering of the unit if that is necessary, right through to the final construction phase of the plant. I would like the committee to realize that there is this very large amount of work behind these numbers.

Mr. McConnell: There is just one additional thing that maybe we should make clear to this committee, and that is that the question itself asks how demand/supply options cost estimates are determined. Now that reply can be given in the context of how the demand/supply options costs were done for the purposes of the crude screening estimates that we did in the demand/supply options study, or that question can be asked in terms of making planning decisions.

We have never claimed that it was important to have precise estimates for the screening process that was associated with this demand/supply options study but, of course, when we get down to the point where we are taking about making some major decisions, possibly in 1989, we have to remind you we have not made such a decision since 1978. We are returning to a process after a decade of silence in which we have not really done detailed planning estimates, and what we are describing to you today is the process that we are using in preparing planning estimates for next year. They, of course, are prepared with a great deal more detail.

Mr. Charlton: I think you just condemned us to spending next summer with you again.

Mr. Chairman: I am not sure I would use the word "condemned," Mr. Charlton.

Mr. Passmore: There is some concern–or perhaps not concern, but the reference has been made–as to why we keep going back to the specific example of gas. I guess it is because, according to some of the witnesses who have appeared before the committee, that option seems to be one of the ones with the most potential. We have heard figures of 1,000. We have heard figures of 3,000. We have heard figures of technical potential of 10,000 megawatts of gas cogeneration potential in Ontario.

One of the suggestions that was made by the technical advisory panel was that it would be useful if Ontario Hydro would provide some kind of a flow diagram similar to this figure 2, "Specific Steps of Power System Planning," which was in the panel's report on page 14. Relating back to the specific issue of gas again, it was indicated in the document 652 SP done in February 1986 that one of the options not expected to make a major contribution in the period 1990 to 2005 was major gas, because of its high costs.

We are at the stage now where we are about to identify alternative plans, or some time in 1989 we are going to identify alternative plans, and I am wondering whether based on this new figure that Mitch Rothman showed us today of $3.35, Ontario Hydro is now prepared to go back and redo its resource analysis so that we do not come to the conclusion, when we are identifying our alternative plans in 1989, that one of the options that is not expected to make a major contribution in the period 1990 to 2005 is going to be major gas.

In other words, first of all, are you prepared to go back and revisit your analysis of the resources based on this new price and, second, how do you incorporate it into a plan in time for this exercise that you hope will take place in 1989?

Mr. McConnell: Could be. The analysis that was done in 1985, as we have said before, was to develop a strategy. Assuming that we get to the point where we have an agreed strategy, we would be proceeding with the development of the definitive plan, and that the strategy does not exclude the gas option. It will be one of the things we will simply update the costs of and it will be an option.

Mr. Passmore: Could you refer to this chart, by any chance? Do you have a copy of this? Does anybody there have a copy of it?

Mr. McConnell: Yes.

Mr. Passmore: Where do you think we are right now on that power system planning flow

chart? Where is Hydro? We have done the analysis with the resources, I assume.

Mr. McConnell: Everything that is done on that chart is done every year and it is an integrated demand/supply process.

Mr. Marriage: We are always in a continuing planning process.

Mr. McConnell: It is a continuum that never stops.

Mr. Passmore: Okay. At some point, though, you have just indicated we have to go back to what we did in 1978–I think that was the year you used–and identify some preferred options, some alternative plans at some point.

Mr. McConnell: If there was a new strategy, a new option that emerged in February of next year that looked like an attractive option that was not on the table today, it would automatically be on the table when we did our evaluation, if it looked like it had merit.

Mr. Marriage: We will be reviewing all of the options when we are putting the definitive plan together for next year. If some of them have changed and look better, we will be giving them more consideration or if some have changed the other way, but we will be going through all of them.

Mr. Passmore: One of the concerns then that has been raised by a number of witnesses is that you not identify plans which lock you into long lead-time projects, which then might turn out to be unwise decisions because of the inflexibility of having done that. What happens if you identify an alternative plan which locks you into a long lead-time project and suddenly, in February 1989 or February 1990 or February 1991, something happens that says: "Hey, we have made a mistake here. There are some options out there that we did not consider. We are getting a lot more of X and Y than we expected to and we should not have done Z."

Mr. McConnell: Yes, and we have in strategy elements 2.2.1, 2.2.2 and 2.2.3 identified that in fact we know there are short lead-time options and there are long lead-time options and that we use a probability-based risk assessment process.

If we find ourselves going down a recommended route that is a least-cost evaluation process and then it turns out that we start to track high, we want to be in a position where we are not going to be charging our customers an arm and a leg in order to make that upward adjustment.

That is why in our strategy we identified that we would not have a fixation on a median plan, that we would do a bandwidth analysis and that we would include in that the flexibility of being able to move upward or downward to minimize the cost to our customers in making those adjustments.

1520

If you have short-lead-time items, they obviously give you greater flexibility. If, on the other hand, those short-term lead-time items are characterized by having a high cost, then they have a risk in the other direction. You have to trade off in your risk evaluation process those lower costs that are associated with your longer lead times against the flexibility that you get with your shorter lead times. That is all taken into account in the least-risk cost planning process.

Mr. Marriage: Those plans are reviewed every year and altered if conditions change.

Mr. Snelson: Could I just make a point here? I think the impression has been created that we are not interested in gas, and that is an incorrect impression. If I can give you some of the uses that we are currently considering gas for, and this is in the detailed planning sense, it will give you an idea that gas is not something that has been pushed to one side.

Obviously, we consider gas to be a good fuel for cogeneration. You have been told several times that we are signing up cogeneration projects fuelled on natural gas. We have more than 100 megawatts of that lined up in just the last little while and there will be more. We are using gas as a fuel for ignition oil in Atikokan and we are considering it as part of the rehabilitation of Lakeview.

We are considering gas as an option to substitute for coal if we need to lower our sulphur emissions further. This is a potential alternative that could defer the need for scrubbers on some of our existing plants. We are considering gas. It is identified in the strategy documents as an initial stage in an integrated gasification combined cycle project. If gas prices were to remain low that would inevitably in our planning get stuck at and stay as a combined-cycle gas-fired plant because if gas prices are low, you will not spend the money to add the coal gasification to the front end of it.

We are considering gas as a fuel for Hearn GS if it is necessary to restart Hearn because of higher load growth. Another gas-fired project which has probably been brought to your attention is the Trigen project in Toronto.

The thing that the strategy says is not, "Don't use gas." It just says, "Be a little bit cautious because in the long run there is not all that much of it around." There are ways in which you can

protect yourself against the long-run increase in he price of gas. This is some combination of ong-term contracts for fuel supply and high efficiency of use. Clearly cogeneration, in parɪcular, protects you against gas price increases in he long run to some degree, because if you are ısing the gas efficiently, you are less sensitive to he fuel crisis.

Of course, there is the ability to convert to ınother fuel, if necessary, which is what you can ;et from the staged development of integrated ;asification combined cycle. If gas prices stay ow, you will find that the application of the trategy will lead to the use of gas in certain pecific installations.

Mr. McConnell: If I may, I would just like to ead into the record an answer that I have here rom our fuels division to Mr. McGuigan's uestion in terms of the rolling stock and the elationship with grain traffic.

In 1987 and 1988, we are purchasing more oal than we had contracted for. We are presently sing rail capacity to its limit. It is limited by olling stock. All of Hydro's, as well as the ailroad's rolling stock, is now being used. ntario Hydro stock has a 3.5-million ton apacity. We are currently buying at the rate of .5 million tons. The major long-term limitation n the amount of western Canadian coal we can se is the amount we can burn. There is no elationship that we can see between the raiload's ability to ship coal and the amount of grain affic.

Perhaps I could have just read the bottom one, ıt that gives you kind of a feel for it, Mr. IcGuigan, so that there does not seem to be ıything here that would be affecting the price.

Mr. McGuigan: Say you decided to build a ew, major, coal-burning plant, then it might ome into play. If you are burning all the coal that ou can get or you are limited now–

Mr. McConnell: We are saying we are using verything now.

Mr. McGuigan: Yes.

Mr. McConnell: In other words, we are ying all of Ontario Hydro, as well as all of the ilroad rolling stock, is now being used. verything is in use.

Mr. McGuigan: If some of the equipment is present hauling grain, it could be adapted to al. There is a possibility that you could get ore from western Canada. That was the point I as trying to make.

Mr. McConnell: I guess I would have to go ck to that question. I get the impression that there is no mate there, but I could ask that question as well.

Mr. Penn: The only thing I could add, Mr. McGuigan, is that the transportation of coal by rail, of course, requires automatic delivery of the coal at our station. I am not sure. We would obviously have to modify the rail equipment to do that. It is a very important part of the efficiency of the use of the coal.

Mr. Richmond: I would just like to make a few general remarks, not so much questions, to assist myself and to assist the committee in what the Hydro panel have said this afternoon. It seems the major theme of what you have said is that the strategy is, to paraphrase Mr. McConnell–if I can put words in your mouth–sufficiently robust or adaptable to survive the impact of these price changes in various fuels about which the committee and various witnesses have posed questions. You feel that the strategy can survive that. Those changes in prices do not affect any of each of the 52 strategy elements.

When I think about my profession, though, I am an urban planner and planners do these types of plans: they have general plans, neighbourhood plans and they go right down to zoning bylaws, which are similar to Hydro's hierarchy of plans, the DSPS being the most general one.

A number of municipalities, though, often by statute or practice, set in place something like 10-year reviews of their equivalents of DSPS. What I would like to know in general terms, once the DSPS gets adopted, is whether Hydro might contemplate–I do not know whether it would be 10 years–a review process. That is one clarifying point.

As for the other thing, if I were to think of a change that would have called upon Hydro to change the strategy–I will just mention this and you can respond to it. Let's say Mr. Bradley, the Minister of the Environment, had greatly tightened up the Countdown Acid Rain guidelines and also put in place a policy on the greenhouse effect that had the effect of removing the coal option from further consideration for power generation in Ontario. Presumably, if a change like that had occurred in the last few months, it would have required a change in the strategy to remove the fossil fuel strategy element from the DSPS.

I am just posing those things really as clarifying points. It is my understanding of the main theme of what you have attempted to convey to us this afternoon.

Mr. McConnell: I think you have captured the essence of it very accurately. To be just a little bit more precise, if an observation were made

that there were some profound, major change in the data having to do with the existing situation, that might in fact make the strategy obsolete and it would be necessary to do a major review of the strategy itself.

In our presentation to the select committee of 1986, we indicated that we hoped that the strategy might survive some five to seven years before it would be necessary to review it. Even if the data did not change, I would hope that my successors would see fit to revisit it and look at it every five to 10 years, so I am simply agreeing with your observation.

1530

With regard to technology change, it has been the exception rather than the rule. Major commercial options in the power business usually take 20 to 25 years to emerge from the time they are seen as a gleam in somebody's eye. You do not go from a demonstrator to a prototype to large commercial operations overnight. Of course, things like cogeneration are not new. I certainly teethed on those when I went through university. We all had to operate the cogenerator in the university. It has been around for the better part of a century.

Technology change is unlikely to bring about major need-to-change strategies in five to seven years. It is more likely to be that it is time to take another look.

Mr. Richmond: But if you had a change like the one I outlined in terms of government law–

Mr. McConnell: No. With respect to the greenhouse effect, I think I made the statement in early August that we had not blatantly considered the greenhouse effect when we developed the strategy, and so the strategy does not explicitly give major consideration to the greenhouse effect, but the strategy, when we went back and looked at it, did implicitly cover it.

You will recall that we in fact had a list of primary criteria and a list of secondary criteria. One of the primary criteria we had identified was that whatever we do, that option has to be considered socially and environmentally acceptable to the day. If the Minister of the Environment of Ontario or some new federal requirement were created, that would become a new condition that we must satisfy. That may turf out some options. As an example, when the international conference that had to do with global concerns took place on June 27 here in Toronto, that document recommended that all advanced countries in the world consider cutting back CO_2 emissions by 20 per cent by the year 2005.

If Canada were to adopt that criteria and i
Ontario in turn were to follow that criteria, and i
that in turn were superimposed on Ontario Hydr
to contribute its fair share, we would expect i
the spring of next year, as one of the alternatives
to be coming forth with a greenhouse scenari
that would say how we could meet that. In fact
that is in the plans we are developing now. It i
implicitly in the strategy, but it is not explicitly i
the strategy.

Mr. Richmond: Something like that you hav
agreed then could cause a need to change one o
more of the strategies.

Mr. McConnell: I was trying to tell you tha
the strategy at the moment will in fact cover it, i
the way we have written it. On the other hand, i
we knew right now that we had to cut back carbo
dioxide emissions by 25 per cent by the yea
2005, including nonutility generation, th
would almost throw out the use of furthe
expansion of gas and coal. Effectively, we woul
have to terminate our cogeneration associate
with gas, because of course it is a CO_2 emitte
albeit at only half the rate of coal. It would have
major impact.

Yes, I think that if we knew that blatantly, w
would write a different explicit strategy, but
does not yet exist. I think the strategy adequatel
covers it for the time being.

Mr. Richmond: I just posed that to clarif
what we are dealing with here.

Mr. McConnell: Okay.

Mrs. Grier: If I asked you for a one-sentenc
definition of strategy, policy and plan, could yo
give it to me?

Mr. McConnell: A strategy is a set o
priorities, guides and–what was the other one?
principles that are used to direct us in th
development of annual plans.

Mrs. Grier: And a policy?

Mr. McConnell: A policy is a gener
principle. Are we talking about policy in th
narrow context of the government?

Mrs. Grier: I am trying to address th
criticism of DSPS that was made by som
witnesses that there was a confusion betwee
strategy and policy.

Mr. McConnell: Let me talk about govern
ment policy.

Mrs. Grier: Oh, no, that is even mor
confusing; Hydro policy.

Mr. McConnell: We regard governme
policy to Ontario Hydro as a general direction th
government is giving to us that would be

principle and/or constraint that would limit our degree of discretion.

Mr. Charlton: Or experiment.

Mrs. Grier: That is your definition of government policy.

Mr. McConnell: Yes, it is. I am talking about it not as it relates to the society as a whole, but as it relates to Ontario Hydro.

Mrs. Grier: Okay. When you develop your strategy, which is to enunciate the priorities, guides and principles that affect your annual plans, what is the next step in your planning process? Do you turn that strategy directly into a plan?

Mr. McConnell: We develop a plan that uses and applies those principles, guides and priorities.

Mrs. Grier: And a plan that implies making some choices and some decisions.

Mr. McConnell: That is right. We have defined a plan in the opening remarks I gave to you, in which we gave you a specification of what would be in the plan. I would have to go back and look at it. I think there were some five components we identified that would lay down the continued utilization of facilities that are already in service and any rehabilitations that we might make to those facilities that now exist. We indicated it would communicate committed and uncommitted demand management programs. We indicated it would communicate definitive nonutility generation we had already contracted for, and what our forecast was of what we expected to achieve in the planning time horizon. We indicated that it would embrace the committed and uncommitted plans that were not yet in service for supply, and that would include major purchases. Lastly, we indicated we would communicate our expectations having to do with mothballing and demothballing, and taking out of service facilities that now exist. I think that was the list. I would have to go back and check it.

Mrs. Grier: You have a better memory than I have. When you were asked about the figure in the technical advisory panel's report to us, this figure 2 on power planning, you said that was something you did annually.

Mr. McConnell: This is an ongoing process that we are doing continuously and we file a report annually. We have up to now, but the annual report that we would file next year, which uses our planning process, would be in conformance with whatever we ultimately end up with by way of an improved demand/supply planning strategy.

Mrs. Grier: I see, so whatever annual plan you develop based on this kind of process must fall within the strategy as enunciated in the document we are studying.

Mr. McConnell: That is correct. It would have to fall within the limits of the direction we got from the provincial government. It would have to fall within the limits of the laws of the province and the federal government and then it would conform with the approved strategy.

1540

Mrs. Grier: Is not an awful lot of this kind of economic and mathematical financial consideration premature, then, until the framework of policies, priorities, guidelines and principles has been agreed upon?

Mr. McConnell: That is why we said we do not want to be preoccupied with precise evaluations of the options available to us. We call it a crude screening process. That is also why we did not attempt to evaluate in our representative plan process all the options which might exist. In order to test the strategy, we looked at what we call representative plans. For example, we took the extreme position: "Let's meet the future exclusively by demand management. What does it mean?" We had to go through that representative analysis in order to communicate to you what the implications were of taking those extreme positions.

Out of that we therefore recommended what we call the mixed option, the portfolio that looked at all of these things. We said, "We want to go gung ho for demand management and get everything we can out of it, but we're not proposing to raise the price of electricity sky high." We had given you the implications of that process. It was a representative plan analysis. It was not looking at all options in the extreme.

I know that is a very difficult thing to grasp. I feel great sympathy for this group; in fact, I marvel at the insight this group has got in such a short time. We certainly agonized for an awfully long time in trying to figure out how the heck we could go about getting a handle on this mass of options with which we could go forward to meet electrical supplies in the future. It is a very awkward process.

Mr. Argue: Following up on Mr. Richmond's comments about the robust nature of the strategy to take into account changing circumstances, I would like your views, Mr. McConnell, again coming back to the gas example. I have just gone through the 52 strategy elements and I see two particular strategy elements I would like your

comments on: on 2.4 on resource preferences; then, when I look at fossil, the only discussion I see is the following, 5.9, "Ontario Hydro will maintain and improve its knowledge base of new developing coal-burning technologies that promise reduced emissions and/or increased flexibility." I am wondering where the option of gas falls into the 52 strategy elements.

Mr. McConnell: In our presentations to you, we indicated in an earlier supply strategy, 5.1, "Major increases in supply will be provided by the lowest-cost supply or purchase options available to meet the need after allowing for the effects of demand management and independent generation." That was intended to embrace oil, gas and coal. We were aware, when we wrote that particular statement, that gas has extraordinarily good qualities. It is clean, does not emit sulphur dioxide, is easy to burn and is characterized by a lower capital cost than that associated with coal.

On the other hand, coal is very abundant in North America and Canada. We know that over the long term, oil and gas are scarce resources. Everybody knows that a century from now gas is not going to be a major option for this continent. We felt, therefore, that what we needed was to somehow have a special strategy that was associated with coal because at the moment it is suffering from the concern having to do with acid gas.

We said that what we have to do with that abundant resource is to stay abreast of the technology that will keep that low-cost coal in the picture. We know the technology today is not acceptable, generally, to society in North America, so we have made presentations to you that indicated we were interested in this integrated gasification and combined cycle. We communicated that at the front end of that we could go the gas route, particularly if it was low-cost at that time. The gas is in 5.1; 5.9 is focused specifically on coal because its qualities today are not acceptable for our society.

Did I miss a second question?

Mr. Argue: That is fine, sir.

Mr. Chairman: Perhaps we could move on then to the next area we want to delve into. It relates to forecasting and uncertainty surrounding the forecasting, which of course is something we have come back to time and time again. I think Hydro has indicated how difficult it is.

There are sort of two questions on the list we did. First, perhaps you could comment on any measures that are under way to improve the planning or your forecasting methodology and techniques. We have heard some witnesses talk about more sensitivity analysis and that sort of thing. I suppose the other was how in general you might react to what appears to be a very uncertain future. I am referring to whether you are thinking of making any changes in order to react to that uncertain future.

Mr. McConnell: Which specific question have you moved to, the first one under forecasting?

Mr. Chairman: Both of them together, really, Mr. McConnell.

Mr. McConnell: We will first have Mr. Rothman deal with the measures that are under way to improve the forecasting methodology and then I will ask Mr. Snelson to comment on the second one. Do you want us to reply to both of those before you have a discussion?

Mr. Chairman: Yes, I think so. We planned to spend about half an hour on this.

Mr. Rothman: We are doing several things to work on our bandwidth forecasts. If I were simply to read the notes here, I think we would all be extraordinarily confused. For example, if I were to describe what is in my notes here as a stochastic simulation using a heuristic approach I am not positive the committee–

Mr. Chairman: What language are you speaking at this moment?

Mr. Rothman: That is statistics.

A number of suggestions have been made about ways we can improve our bandwidth methodology. We are investigating three new techniques, and we have also looked at improvements that could be made to the existing technique. Essentially, all of those techniques assume we can make some better assumptions about the future and about the quality of our forecasts of the future than simply to assume they cannot be any better than they have been in the past.

In some techniques, for example, we are surveying other forecasters to ask them what their bandwidths are, not for the load forecast but for economic forecasts in the future. Once we have those estimates, those probability estimates from other forecasters, we can use those to help us see what bandwidth we can put around our own forecasts, but again, that assumes those forecasters can make some assumptions about bandwidth in the future that are, in general, tighter than we would get if we simply used past histories of forecast errors.

We are investigating three such techniques, as I said, and we have looked at a refinement to our

xisting technique and we expect it will have ome significant results soon.

550

Part of the reason that we may be much more ɛady to move towards a tighter forecast band is ıat the immediate history is telling us not only o those periods of large forecast errors ultimate- y go away, but we have some reason to believe ıat they will, because we do not sustain very igh or very low rates of economic growth over a ong period of time. They can tend to be elf-correcting. The kinds of things that produce ery high rates of economic growth over even ve to six years will shortly produce effects that ill make economic growth slower over the ıcceeding years. Similarly, things that produce ery slow economic growth over a period of ears ultimately lead to higher rates of economic rowth.

That is true even if we go back to the currently ost well-known experience of very low rates of conomic growth in the Depression. In fact, the epression consisted of two or three years of ery low rates of economic growth, very high tes of negative growth, followed by a return to me more or less normal period of economic rowth with some cycles in it.

So we are making those kinds of assumptions ıd we will likely be even more willing to make em when we come to do our next round of ıcertainty analysis. It is difficult yet to say what ır conclusions will be, but I can tell you that we e coming closer to those kinds of conclusions in is round.

Several people suggested that use of the ıd-use models would somehow help us reduce e band of uncertainty. I do not see how that will lp. We are working as hard as we can on ıtting resources into the end-use models, ıproving our end-use modelling capability and ır end-use data base. But I do not think the ıd-use models themselves help us in the ıcertainty analysis, because the end-use odels, as I said when I spoke to this committee rlier, require a large number of detailed sumptions.

If we are talking about uncertainty, what we ould need would be a large number of ternative detailed assumptions if we were to use e end-use models to produce a bandwidth. We ould have to get some sense of what the obabilities are of those alternative detailed sumptions if we were to be able to use those for aking uncertainty statements with the end-use odels.

I think the end-use models are very useful, we are working as hard as we can to put them together, but I do not think they are going to be terribly useful to us for the uncertainty analysis. We are using and developing other models that I think will be very useful for that purpose.

Mr. Snelson: The other aspect of your questions in this area related to what renewed efforts we are making to our planning to accommodate uncertainty. This is one of the areas that is very difficult in planning and it is an area, along with other areas, that we are continually looking for ways to improve.

Some of the improvements we are looking at or trying to make include the narrowing of the bandwidth forecast that Mitch has talked about. If one can say with confidence that the bandwidth is narrower, then that simplifies the planning considerably.

We will be looking at reasonable deviations. When we come up with plans, we will be looking at a range of possible outcomes from those plans, trying to take into account reasonable deviations and trying to assign probabilities to that so that we can come up with a weighted, probabilistic evaluation of the expected cost of the decisions that we make in the next few years, and that is the total least risk cost process that Mr. McConnell has mentioned.

We are also interested in achieving improvements to the approval process for planning so that the approval process will be less of a constraint on flexibility. The approval process is a constraint in one direction but not in the other.

We have heard people talk about a nuclear plant's 13-year lead time and so on. As things are at the moment, if we wait until the last moment when we expect to need a plant 13 years hence, and start an approval process, then that is a constraint on how fast you can go. It is not a constraint on how slow you can go. It does not really become a constraint on how slow you can go until you get past the point of approval and start to make major expenditure commitments. At that point, there starts to be some constraint on how slow you can go. So we are interested in improvements in that area.

People from the northwest have talked about optioning processes. That could be seen as having some characteristics similar to that. Obviously, the approval process is within the control of the government and we are working with them on the review of their environmental assessment process.

Another area of increased flexibility we are looking at–and this is in Bill Penn's area–is the

design and construction methods of major projects, in an effort to reduce the construction time so as to keep the construction times down, which adds to flexibility.

Mr. Charlton: I do not think we come out of that understanding very much about where you are headed in terms of trying to reduce uncertainty. You said on the one hand that you are looking at improvements to the current approach. Can you perhaps tell us what some of those improvements are?

Mr. Rothman: The current approach, as I said, simply looks at past errors and effectively projects that the next 25 years will be about like the past 25 years in terms of how good our forecasts are and how uncertain the future is.

One of the things we did was say: "We had a few years in the past 25 that were really extraordinarily large errors. We had big recessions or we had major errors in those few years. Would our methodology look a lot better if we threw out those few years and said, 'Those are really aberrations and the rest of the years were more normal.' What would happen to our methodology if we threw out those few years?"

We tried that, and the answer we got was, "Not very much." It does not change the bandwidths very much to throw out those few years.

We also tried something that essentially said, "If there has been a systematic bias in the past forecasts and we assume there is a systematic bias in future forecasts, can we reduce the bandwidth?" The answer is that if we assume from the beginning that our forecasts are wrong, then we can reduce the uncertainty in the future, but I think we do not like to assume from the beginning that our forecasts are wrong. So we kind of rejected that approach. But those are the kinds of things I mean that work around the existing methodology.

Mr. Charlton: You said to us that you were working really hard to develop the end-use models and the data from which to work on those end-use models, but you also said that you did not think the end-use models would help very much in terms of reducing uncertainty. Can you give us some rationale for the comment?

Mr. Rothman: Sure. What we want in terms of this uncertainty forecast is to be able to make probabilistic statements about our forecasts. That is, we have a median or a most likely forecast and we want to be able to make statements about alternative forecasts that contain some notion of probability.

Currently, we have an upper band, and we say there is a 20 per cent probability that the actuals will lie above that upper band. We have a low[...] band, and we say there is a 20 per cent probabili[...] that the actuals will lie below that lower ban[...] What we are looking for are the methodologi[...] that will let us make similar probabili[...] statements–the probabilities may be differen[...] but the statements will be similar–about ban[...] derived in some other way.

1600

I do not think the end-use models will [...] terribly helpful in that, because in order to be ab[...] to make alternative forecasts, to state alternati[...] bands with the end-use models, we would need [...] have the myriad of assumptions that go into t[...] end-use models to generate those bands. W[...] would then have to have some notion of what t[...] probability is of each of those myriad assum[...] tions and then how they work together to produ[...] probability for that alternative forecast. That [...] why I think it would be difficult to use t[...] end-use models to produce uncertain foreca[...] bands more readily.

Mr. Litchfield talked about a scenario a[...] proach. If you look at his scenario approach, [...] simply states some alternative scenarios to t[...] forecast and says those form reasonable bands f[...] planning, but he does not make probabilis[...] statements about the width of those bands, wh[...] the probability is of being above or below tho[...] bands, nor about the probabilities that can [...] attached to those scenarios themselves. He [...] saying, "Let's do some scenarios, and we w[...] wind up with scenarios that, with some implic[...] tion of judgement, can be said to form reasona[...] bands and use those bands." Our approach h[...] been that we would like to be able to ma[...] probabilistic statements about those bands, a[...] in order to do that, we need more comp[...] models than the end-use models, models [...] which we can have a relatively small number [...] assumptions so that we can assign probabilities [...] the width of those assumptions.

Mr. Charlton: But is it not also true that [...] need to assign probabilities above and below [...] band varies with the width of the band?

Mr. Rothman: The probabilities that y[...] assign above and below the band will vary w[...] the band. What we are currently trying to se[...] whether we can find some way to ma[...] statements about the band that will still give u[...] reasonable width but a lower probability of be[...] above and below it.

Mr. Charlton: For example, we have had [...] discussion several times now, a couple of ye[...] ago and again this year, in terms of the abilit[...]

timate both what is going to happen in the onomy over 20 years and how demand for ectricity will track with that growth in gross tional product. One of the things that the d-use model approach does for you is that, to a gnificant extent, it more specifically defines the onomic growth that we are talking about out ere. It defines the changes in industrial process at are going on. It defines the rate at which frigerators are being replaced with more ficient equipment, so in effect, instead of just ying, "Because the economy is going to grow X per cent over the next 20 years, and we think ectrical use will track that fairly closely," you e in a position to actually look at, in probability rms, what is really likely to happen, even in a ally prosperous period.

Mr. Rothman: It really goes the other way. In der to use the end-use model, we have to be le to define what might happen to industrial ocesses. We then can put that through the odel. In order to be able to use the end-use odel, we have to define what is likely to happen refrigerators. We can then assess that through e model. The model itself does not do that.

Mr. Charlton: Are we not doing part of that b for you when we start passing standards gislation?

Mr. Rothman: Sure. Again, if we tried to use e end-use model–just think about this kind of estion of making a probability statement–if u wanted to use the end-use model to make obability statements, think about the problem assigning a probability to a particular set of dustrial processes for each of the five or six ajor energy-using industries that we are model- g closely in our end-use model.

Then there is the problem of assigning obabilities to particular efficiencies for average otor use in commercial sectors and heating use d other process use in the industrial sectors, d similarly for the residential sector. You ould have to put all that together and assign int probabilities to all of that. You are talking out hundreds of variables. You would be going rough assigning probabilities to–

Mr. Charlton: I understand that, but the riables are not calculated variables in some nd of backroom research office. I can go to elco and talk to them about an end-use model out what the hell their plans are in the next 20 ars.

Mr. McConnell: Let me see if I can respond your question with maybe a different ap- oach. Mr. McGuigan, I thought, made a very thoughtful comment here a couple of weeks ago when he said, "Perhaps the approach that you should take in forecasting is simply to have the politicians decide where they want to be and then ask the electricity planners to make that happen."

Mr. Charlton: We may do that yet.

Mr. McConnell: I think that was a very thoughtful comment and a very meaningful one. Not that I believe that the President of the United States, the Prime Minister of Canada or the Premier of Ontario necessarily can make happen exactly everything they say is going to happen.

But on the other hand, it brings out the point that when you are talking about end-use analysis, it does not really tell you whether my daughter, who wants an air-conditioner, is going to be able to afford it or not because that is going to depend upon the political effectiveness of the society in which we live in the western world, in North America, in Canada and in Ontario. So the amounts that people can afford will depend the effectiveness of our society. That is not taken into account by end-use analysis specifically.

Mr. Charlton: It all depends, as we have said from the outset, on what your best guess about economic projections for the next 20 years is, except that once you have made those economic projections and you have started to do analysis of what the takeup is in terms of end use, under certain economic conditions, you are far more likely to be close to reality than to just assume that you are going to track the gross national product.

Mr. McConnell: All I was really trying to do was to come at it from a different approach and to say that these uncertainties depended to a very large extent on the behaviour of our society and to a lesser degree on the analyses that are associated with the individual electrical compo- nents that are available for people to utilize. I think I was simply picking up on the observation that Mr. McGuigan made.

With regard to this basic question that Mr. Rothman has been describing in terms of bandwidth and confidence in assigning numeri- cal probability, you may be interested to know that in 1972, the then chief engineer of Ontario Hydro, Harold Smith, and myself tried to convince the North American Electric Reliability Council that in the electrical planning business we had a preoccupation with central tenancies. He was then the vice-chairman of the North American Electric Reliability Council. I hap- pened to be chairman of the northeast, looking after New England utilities, New York, Ontario

Hydro and so on. We were not successful in getting a take at that particular time.

On the other hand, we got a response because a number of individual utilities took up the suggestion and started to develop in utilities throughout North America. There was a gradual emergence of bandwidth planning, and this was particularly accelerated by the horrible errors having to do with what could happen when you had oil embargoes and so on and the oil took off like a rocket.

1610

In 1983, when I became chairman of the North American Electric Reliability Council engineering and/or planning committees, I had the unique opportunity to be able to appoint the best forecasters in the United States to a task force to produce a bandwidth for the United States. Under my direction, it was prepared and we reviewed the things Mr. Rothman was talking about: Was there a better way, other than just applying the statistical errors of the past?

That group did come up with the methodology and that material is being published in the United States. It does have a bandwidth confidence of 80 per cent–that is to say, a 10 per cent chance of being higher or lower–and is indeed a narrower bandwidth. It was not a technique that could be easily applied to individual utilities.

In the next step, we created a task force for Canada. Of course, Ontario Hydro was a participant in that, so we went through that experience. Following that experience, in which we developed a bandwidth for Canada using a somewhat different technique but still a basic thrust, the request went to Mr. Rothman and company to take a fresh look at what could be done for Ontario Hydro. That is what Mr. Rothman has been describing to you.

I do not know whether you have communicated, Mitch, but basically from a planning perspective we felt we would be better off if we had an 80 per cent confidence in terms of that bandwidth. We were already shocked by the impossibility in our planning process with such a wide bandwidth as we already had.

I do not know whether you can identify just exactly when you expect this study will be completed, but I gather it will be by the end of the year.

Mr. Rothman: We expect to have a new methodology in place, if we decide we are going to adopt one, for the next long-term load forecast.

Mr. Charlton, let me try to agree with you to a large extent. I think what you are saying is that end-use models are very useful for scenario formation. I cannot agree with you more. End-use models are extremely useful for scenario formation; in order to see what happens "if"; in order to be able to understand how the end-use market reacts to things like standards, reacts to things like new technologies becoming available, reacts to changes like changes in processes at the end-use level.

I think those are extremely valuable uses of end-use models and that is one of the reasons we are constructing them, but I do not think that kin of scenario analysis readily lends itself to makin the sorts of probability statements we hav wanted to make to form our bandwidth forecas That is really all I was saying. I agree strongl that end-use models are useful for scenari construction and that scenario construction is a important activity in the context of load fore casting.

Mr. Passmore: Mr. McConnell, whether not we can determine if your daughter can affor to buy an air-conditioner, what we can do if sh can afford to buy an air-conditioner is make su it is the most energy-efficient air-conditioner c the market. It can in fact be such an energ efficient air-conditioner that whether she bu one or does not buy one the difference is almo inconsequential.

Mr. McConnell: I fully agree. That was wh Ontario Hydro started research in the 1970s, an we feel we have done some of the most advance research in the world, on heat pumps and the lik particularly for a northern climate. I fully agree

Mrs. Sullivan: I am wondering if after t macroeconomic analysis is done, the end-u forecasts or models are really more valuable forecasting demand management efficiency a conservation results than new supply, and indeed they become the first step in terms identifying target markets.

Mr. Rothman: Yes, that is one of their m important uses, I agree. Unfortunately, in so cases the models that we are currently co structing, the Electric Power Research Institu models, are a little too aggregate for some of t demand management questions we would like ask of them, but they certainly provide t framework around which those questions can asked and they certainly do provide the inform tion that you can use to start asking the questio about where you might look first, as y suggested.

Mr. McConnell: Related to that question you go back to the 1986 select committee,

vere strongly urged to increase the resource :apability having to do with demand or end-use evaluations, which we did. We have taken a beating by the Ontario Energy Board saying that our effort is too great, and more recently we have ıad an external consultant in who reviewed our process and said it is just right. Then more ecently we had the technical advisory panel say hat we should increase it.

With all of this push-pull, the president at the noment has said, "Stay at the level you are at and eep it working as effectively as you can." We vould be interested in your observations as to vhether you want to depress us, increase us or eep us the same.

Mr. Argue: Mr. Rothman, when you are orecasting and you are looking out over a 5-year period, the forecast presented in the DSPS, what would you say to looking out, say, our years from now, how much better an idea ou are going to have at the end of that 25-year eriod? Say you were looking at year 5 of that 5-year period; how much more certain would ou be about what was going to happen in 20 ears' time?

Mr. Rothman: In terms of the kinds of things was just talking about relative to the bandwidth, e are now kind of thinking that maybe we are a ttle less certain about five years from now than bout 20 years from now in some ways. We are ore certain about technologies and end-use vels five years from now than we are 20 years om now, but in terms of the economic cycle and e general level of economic activity, five years om now is much more affected by short-term yclical kinds of effects than would be 20 years om now. Once burned, twice shy.

If we go back to 1981 and 1982, you had a lot economists back there dusting off their epression scenarios, all of the being uniformly rprised by the strength of 1983 and especially 984 and 1985. We are back very close to the end line that would have been established in the rly 1980s, despite the dip that we went into in e interim, which caused lots of people to say, Gee, the next five years are going to be pretty ow growth."

In terms of the aggregate level of economic tivity, one of the things we are saying is that we o not necessarily think there ought to be a ndwidth that indefinitely gets wider.

Mr. Argue: The question I am asking is more ong the lines of, if you are at five years from w, how much more certain are you going to be out whether we are on the high, median or low recast at the end of that 25-year period than you are today? Are the probabilities going to change that much in five years' time? Say you were looking at the probabilities of 20 years from now.

Mr. Rothman: The forecasts change and what is high, median and low changes. If we went back five years from today, back to the fall of 1983, we are currently very, very close to what was the high scenario back five years ago.

1620

Mr. Argue: But as a forecaster, would you be any more certain about whether you are going to be on the high, median or low scenario in five years' time?

Mr. Rothman: Essentially, what has happened is that something very close to what was then the high scenario has come very close to what is now our median.

Mr. Argue: I am not asking for what has happened; I am asking what would you think that was.

Mr. Rothman: I think that process would be very likely to continue to take place if we continued to track for five years, very close to what is now the high scenario. Then we would essentially be making the conclusion that what was considered the high scenario five years previously, we now ought to consider something much closer to the most likely or the median scenario.

Mr. McConnell: As you go from the year 1 to the year 5, in your question, Mr. Argue, you are changing the origin each year because it has become a reality. That is to say, when you are at year 1, you have a new origin; you have a new known point. When you are year 2, you have a new origin.

So each year that you are making your forecast you are adjusting the origin to the reality of what has happened. Also, you are reconsidering each year where you think you are heading based on the knowledge of that year. When you come to year 5, you have a new origin and a new set of data that you are trying to project into the future, but on the other hand, that does not say that five years from now you will be any more confident than you are today, any more than you would be confident today compared to 1950. So there is always an uncertainty from now on.

Mr. Argue: Thank you. That leads into the question of taking that forecasting uncertainty into the development–I am referring to strategy element 2.2.2 and I quote, "Contingency plans must be prepared that identify practical options to respond to upper and lower load projections."

I was interested in your preparation and I believe it followed out of some of the preparatory work you did in the representative plans, but there seemed to be an assumption that in 1992 there will be a signal with which Hydro would be able to identify whether we were on the high, median or low load-growth scenario. There was a great deal of discussion on the preparatory work that could go into a nuclear project with which, at that time, you would be able to make a decision in 1992 before capital had been spent.

Nine years after that point, I believe, from your answer, Mr. McConnell, you would not have any better idea about whether we were in the high load-growth scenario or not. You are saying you could make that preparatory work and then commit construction of the facility, and what I am getting as an answer is that you are not really that certain that the high load-growth scenario would hold out over that nine or 10 years.

Mr. McConnell: I think I will have Mr. Snelson respond to that question. Your first question was quite a different question than your second one.

Mr. Snelson: With regard to the definitive plans, when you come to looking at three scenarios–and if you study only three scenarios, with a limited amount of study effort, there is a limited number you can study–if you assume that eventually you are going to be on the upper load growth and eventually on the lower load growth, then you have to build into that scenario some process by which you gradually recognize that what you originally forecast was wrong.

The simplest assumption is a sort of recognition all in one year that it occurs and no recognition up to that date, and it was that simple in the demand/supply planning strategy and representative plans. It was recognized at the time it was done that it was a simplification of a continual process of accommodation as things gradually evolve.

With respect to what stage you assume this occurs, we just assumed that after four or five years, surely we would have recognized that the trend is different, and so we chose that sort of point.

In trying to come up with processes for studying definitive plans, we have recognized that maybe we have to do something that is more sophisticated, something that recognizes that in a better way, and we are trying to come up with a process that will represent this by more than one stage of sort of recognition and will include scenarios where we have gone further down the line in planning for supply options and do, in fact, end up with changes after we have made commitments, and we have to accommodate that.

We would end up in those scenarios with the problems of, do you cancel, do you go with surplus capacity or do you delay and so on. So there will be scenarios in our definitive plan analysis that include that type of circumstance.

There is just a limited amount you can study at one time. The contingency planning and the strategy are not the same as the representative plan analysis. The contingency plan we have this year is based on uncertainty as we see it this year. As plans evolve, those contingency plans will evolve too, all the while recognizing that the future always remains uncertain.

Mr. McConnell: I think that last question you asked, Mr. Argue, is a very pertinent one in terms of how long it takes us to respond to a forecast in which we think that perhaps the trend was away from the median.

If we go back to 1982, we had a negative growth of 0.8 per cent; that is, it was lower in terms of energy than the previous year. That was the first time that had happened since 1930 or 1931. But then we had a society and a pressure on us and everything else, all the world was going to hell and there were great pressures to have load forecasts that were extremely low. It is a real problem for a professional load forecaster to resist the emotions of the day. Conversely, we find today our load forecasters are under tremendous pressures to put in higher rates.

You had a number of people come before you who said: "My gosh, for the last four or five years you have had 5.2, 5.6, 3.6, 3.9, 4.9. When are you going to wake up and put in a value of five per cent?" So we find ourselves saying, "That isn't going to go on for ever either." We may be wrong; maybe it will.

In any event, the point is that when you get short-term fluctuations in a one-year time horizon–it is 0.8 per cent one year and 5.2 per cent the next year–it takes you a little while before you say to yourself, "The plan that I have going there, which I reviewed, I had better start adjusting it and slowing it down or speeding it up."

What Ken is trying to say to you is that although we are adjusting the load forecast every year, we have to wait for a few years before we are convinced that we had better get off the track we are on. We do not want to wait too long because that can be expensive, but neither do we want chaos in the delivery plans by just instan

ljusting everything we are doing every year. hat is a good way to have very high costs.

It is a very difficult question as to when you ecide you are on the wrong path and make the ljustment. We are normally saying that we ink we can sense in half a decade when we are 1 the wrong track.

Mr. Rothman: I think that makes some sense, r. Argue. If you think back to 1983, not only ive we actually had load growth that is close to hat would then have been an upper scenario, it if you think back to what kinds of futures we ere foretelling in 1983, having just come rough the 1981-82 recession, they were futures relatively sluggish growth through the 1980s. ot only had we come through the 1981-82 cession, we had come through a period in the e 1970s of very slow growth, very low rates of oductivity growth and very difficult times deed, with very high oil prices.

If we think of the succeeding five years, we ve had falling real and ultimately falling minal oil prices, high rates of productivity owth, relatively high rates of economic growth d a very rapid recovery from the 1981-82 cession. In 1983, those will all have been nsidered to be the kinds of things you would t into an optimistic sort of scenario. So we say, 'es, it looks like the succeeding five years have etty well followed along the track of what ould have been considered higher than the edian," the then current median forecast five ars ago.

30

Not only have we stayed on that track, but we o now have the prospect–it is not certain by y means, but there is a reasonable possibility at st–of a free trade agreement with the United ates, which we believe will improve productiv- and increase economic growth. So the ospects again now look like they are continuing track along what would then have been a gh-growth scenario.

Probably in the next five years again, we can ok back and ask, "Did the events of the last five ars look like what we were forecasting five ars ago to be things that would be promoting gher growth, or did they look like about what were forecasting or did they look like things t were promoting slower growth?"

Mr. South: Have you thought that maybe you ould not be in the load forecasting business at , that it might be an operation that would be ter carried out by some other group? I really nk you are in a bit of a no-win situation. Now 1 are criticized when you are low, you are criticized when you are high and a lot of people perceive that, as an entity, you have the ability to fiddle with the demand when it does not suit your load forecast.

In a sense, unlike a private corporation, you have no real financial reason why you should be right or wrong in your forecasts. Your forecasts may be based on nothing more than the desire to empire-build. When you are wrong, no one who is making the predictions loses anything in financial terms.

What do you think? We can think that maybe the Ministry of Energy should do load forecasting, and what it would do would be to question the individual utilities as to their future needs and maybe question the large consumers. As I say, I put it to you. Maybe you would be better out of the load forecasting business. Let somebody else do it.

Mr. Rothman: I have very explicit instructions from the man on my right and from his boss, the chairman and president, that my forecasts are to be independent of policy directions from the corporation; that is, the load forecast is not to be construed as meeting whatever needs of the day the corporation might have. Of course, we already do survey all of our customers, both the large industrial users and the municipalities, to get their expectations of the future.

It is certainly not impossible to have a load forecast function outside of the utility. I do not know of very many situations where that occurs, and it occurs within the utility because there are a large number of detailed questions that we need to be able to answer and that we can understand from within the utility better than anyone could from outside. There is a large amount of detailed information we gather that we can gather better from within the utility than could anyone from outside, and there is a process of understanding the needs of the corporation that we can do better than can anyone from outside.

By understanding the needs of the corporation, I do not mean whether it needs a high forecast or a low forecast or a forecast that has high growth for the first five years and slow growth for the next five years in order to justify some policy, but rather a need to focus on particular kinds of forecasts–a need to have a forecast for a particular region because that is where we need to plan regional supply next, or a need to focus on the load factor because that has become a crucial issue. Those kinds of needs can be understood better from within the corporation than they can from outside.

While to some extent I agree with you that internal or external load forecasting is a sort of no-win position, I think it is important that the forecasting function be contained within the utility, because that is the best way to ensure it meets the needs of the utility. You are right that it does create the possible impression that it is not an independent load forecast, but I can assure you I have very strict instructions that the load forecast must be independent.

Mr. South: I appreciate that, and I have heard everything you have said, but you know, I think you are too prejudiced a group, with no great loss to you when you are wrong, as I say, when you are making predictions that really are predicated on empire-building rather than looking after the electrical needs of the province. I think that is a problem that is impossible for you to overcome. That is my view, and that is the view, I think, of many people.

Mr. McConnell: I accept the comment you are making about being vulnerable to empire-building. In our presentations here, we have indicated to this committee that difficulty in forecasting the future is not an excuse for failure to plan. If we stopped planning, we would all fall flat on our faces. We would not have a future. So I do not think anybody here is arguing about the fact that we need to plan.

If you need to plan, you need to make a forecast. You have to have some basis for planning the future. We have indicated to you that you cannot have, over in this corner, one company doing a plan for demand planning and in another corner, somebody doing a plan for supply planning. Sooner or later, you have to get your act together. We have identified that we think the proper thing to do is to have an integrated demand/supply planning process.

I do not think you will find that there are any utilities anywhere that are, at the moment, proposing it be a split responsibility. That would lead to a large degree of confusion.

When you come to the planning, there has to be very good understanding on the part of those people who are developing the plans for demand management and those people who are developing the plans for the supply, who work very closely with those people who in fact are making the forecast. There is a lot of interactive understanding required in that process. I guess my answer to you is that we think there are overwhelming arguments that there should be planning forecasting to bring about planning in Ontario Hydro, but we have no fear whatsoever of having 10 people look over our shoulders and make 10 independent forecasts. We are prepar to stand up and be counted when it comes tim over a period of a decade or so, to see who did t best job.

In response to your question, the bottom line that if Ontario Hydro rates were double those the United States, we would certainly be ve concerned about whether the heck we h become an overgrown monster doing the job t wrong way. The facts of the matter are that have half the costs of the United States. I thi that is the best evidence we can give you that t processes we are using, somehow or other, a working relative to the other guy.

In this world, we are not going to be perfe and neither is anybody else. All we can do, in t final analysis, is to say, "How well did we do f Ontario compared with the other guy, with t opportunities he had?"

Mr. Chairman: Do you have a suppleme tary to that, Mr. Passmore?

1640

Mr. Passmore: I do not know if it is as muc supplementary as just a comment. We are w beyond the chairman's half-hour, but M Rothman talked about the load forecast not bei construed as being in Hydro's benefit, a indeed I respect the fact that those are instructions under which he operates, but I thi it happens by default.

It happens simply because, if we refer back what Mr. Snelson's comment was on taking th to five years before you can react to possi having made an error in your judgement, and of the options–he listed three options: You cancel, you can delay or you can go with excess. If you go with the excess, you have electricity there and you have to go out market it.

It is just like what Mr. Rothman was say earlier. If you build a road, you are going create industrial activity around that road. If electricity is there, then indeed you are going encourage the use of that power.

I guess it brings us full circle to this quest of, are you building to a forecast? If y forecasting is wrong, then you have to go out sell it. It brings us back to this question that raised away back in the beginning by Franklin when he first introduced the whole is to the committee when he said, and I think should keep this in mind, that Hydro is try gradually to move away from being preoccup with building to a forecast and more preoccup with energy services, more preoccupied supplying customers' needs.

These issues tie together, and as I say, ›llowing up on Mr. South's question, by ›fault, because your reaction time is so slow, ›u end up building the road and then expecting ›ople to build industrial capacity around it.

Mr. Rothman: I just want to point out, Mr. ›ssmore, that assumes forecast errors are only ›sitive. In fact, there were periods through the ›50s when forecast errors were negative for a ›ng period of time, and through much of the ›80s our forecast errors have been negative. ›at is, we forecast less growth than we actually ›perienced. You are assuming that the only way forecast can be wrong is that it can be too high. fact, it can be too high or too low and we have ›d periods of both.

Mr. Passmore: Indeed, although you did say ›rlier in the day that we have just gone through a ›riod of fairly active economic activity in the ›st four or five years and that we are probably ›ing to be approaching a period of slowdown in e next four or five years, and that in any case, ›er time, these things tend to level themselves ›t.

Mr. Rothman: Relative slowdown, yes, and ›at is what our forecast says as well. As Mr. ›cConnell pointed out, this committee has heard ›any people urging us to adopt a somewhat ›gher load forecast than the current one.

Mr. Passmore: I am not trying to challenge ›ur instructions, I am just trying to suggest that ›rhaps by default, this happens.

Mr. Rothman: Yes, and I am pointing out ›at in fact load forecast errors can be either ›sitive or negative–

Mr. Passmore: I would agree.

Mr. Rothman: –and that we have had both.

Mr. Passmore: Indeed.

Mr. Chairman: Mr. South, did you have any ›rther questions?

Mr. South: I think the subject has been well ›vered. We both stated our positions and I guess ›m just as convinced that Ontario Hydro should ›t be in the business of load forecasting.

Mr. McConnell: The federal government, the ›partment of Energy, Mines and Resources, ›ecasts our loads in Ontario. The Ministry of ›ergy forecasts our loads. We are quite ›pared to stand up and be counted and compare ›r load forecasts for what actually happened ›rsus these others.

That is what I was basically saying. That is all the record. We live in a fish-bowl, and we ›lly do not have that much concern about criticism. Our concern is whether or not we are doing a good job. Criticism we get and criticism we expect, but what we want to do is to be seen as doing a good job. In the final analysis, when everything is finished, whether we are doing a good job or not will result in the bottom line, because we certainly will have forecast errors.

I might say that in terms of the historical situation, the decisions of the Ontario Hydro of our fathers and grandfathers to follow the high-capital, low-cost route have in fact stood us well in terms of our vulnerability, because when we are caught with surplus, we are in a very excellent position with low-fuellers to market it. In fact, the consequence has been very small or we have made a profit with it. Being in error on the high side, some of the people who came forward to this select committee said: "You should not really be planning to the median. You should be deliberately committing to above the median so that you do not expose this province to a shortage, and you can market the damned stuff anyway, particularly if it is low-fuelling-cost energy." At any rate, that was not our strategy, but it is a factor.

Mr. Chairman: Mrs. Sullivan, did you have a final brief question?

Mrs. Sullivan: Yes, I did. In fact, it is probably a lead-in to the next section. I think we all want to spend some time on demand management but I wonder if you could just do a rerun for us on how you account for natural conservation in a load forecast and how you ensure it is not doublecounted.

Mr. McConnell: You do not know how difficult that question is or perhaps you do know and that is why you are asking it. Mr. Rothman, over to you.

Mr. Rothman: Well, thanks, Mr. McConnell. Essentially, we do not directly account for natural conservation. We make what we now call a basic load forecast. That basic load forecast is made using a variety of techniques, primarily an econometric one and an end-use model. Those techniques effectively contain within them assumptions about increasing efficiency of existing uses. In the econometric model, they are contained in fairly broad-brush kinds of assumptions. In the end-use model, they are contained in great detail for each end use.

Once we have our forecast, we ask the question, "What would our forecast have been if there had been no efficiency improvements?" We produce that number and then we subtract the two. The difference between those two has been called natural conservation. We call it natural

conservation because it describes what will happen as a result of efficiency improvements relative to the efficiency at the base year compared to the forecast we make.

I have to admit, quite blatantly, that we do not survey the federal and provincial governments and ask them what programs of information they plan to do over the next 20 years and forecast that. We do not survey appliance manufacturers and ask them what they plan to do in terms of efficiency over the next 20 years and forecast that. We do not survey the provincial government and ask it what it plans to do over the next 20 years in terms of efficiency standards and forecast that.

Essentially, what we call the natural conservation forecast is derived backwards from our central forecast. When we make the central forecast, when we make that end-use forecast, when we make that aggregate forecast, we take into account what we know about those factors, so that if there were to be significantly higher efficiency standards for housing, for appliances or for the commercial sector, that would get taken into account and would get put into the basic forecast.

It has to be. It will affect the efficiency of future electricity using capital equipment. That is what goes into the basic load forecast. What it would then do is effectively increase our natural conservation forecast, but we do it kind of backwards.

Frankly, I do not see much of another way we could do it. I should not say that. I can see some other ways we could do it, but boy, would they be expensive and difficult. I am not sure they would be a whole lot better than what we are doing now.

Mrs. Sullivan: How are you certain then you are not doublecounting?

Mr. Rothman: What we do not want to doublecount is natural and strategic conservation. When we do the strategic conservation forecast, we look at programs. What kinds of programs are there? Where did those strategic conservation measures come from? We cannot be sure we will not be doublecounting, but we certainly try to look at particular programs and particular measures, to be able to answer the question, "Would that have been done anyway?" in which case, it is not part of the strategic conservation. Would that have been done any way by the energy consumer, or is this only a result of a financial incentive offered by Ontario Hydro to the energy consumer?

1650

Even when you have a program of financia incentives, you have to be very careful with th way those incentives are designed because clearly, if you offer $100 to people to buy, say energy-efficient refrigerators, anybody who wa about to buy an energy-efficient refrigerato anyway, will gladly take your $100 and go ou and do whatever he or she was going to d anyway.

Mr. McConnell: Mostly she.

Mr. Rothman: Mostly she, yes.

When you design those programs, you have t be careful about that problem to avoid double counting the program itself. I do not have an 100 per cent guarantees that there is no double counting. In fact, I expect that there is double counting in all of this, but we certainly try t avoid it to the extent we can.

Mr. McConnell: We have very explic targets and processes that are associated wi incentive programs, where we hand out bucks induce or to accelerate the application efficiency ideas. Our target, as we have indicate to you, is 2,000 megawatts. We have a ve explicit program for peak shifting, of which major feature is time-of-use rates. We have target of that for 1,000 megawatts. There is system limit on load shifting of 1,000 meg watts, I have been reminded, and we have o target set at the maximum we can achieve.

The question you have asked, Mrs. Sulliva is a most difficult one, because we hear an aw lot of talk about frozen efficiency, natu conservation and so on, and that one is the thi of which I think there is the greatest misund standing.

What Mr. Rothman has said in a nutshell that our basic forecast is the expectation of M Rothman and his staff, taking into account wh they think will happen as a result of h manufacturers will behave in advancing techn ogy, how the federal government will behave promoting efficiency and how the provinc government will behave in promoting efficien It takes into account how we expect the t governments will behave in terms of impleme ing standards and how effective they will That is all a composite integration into that ba forecast. Any numbers that are quoted within t are a bit of gobbledegook, if I may use expression.

Mr. McGuigan: Based on my experience agriculture with incentives, you have to look to see whether the manufacturer of the refrig tor raises the price by $110.

Mr. Rothman: We all realize in taking the frigerator we also have to be careful. If we give mebody an incentive to go out and buy a more nergy-efficient refrigerator, we know what pically happens to the old inefficient one. It inds up in the basement for the beer. You have be very careful when you design those centive programs to ensure that they accomplish what you want to accomplish.

Mr. McGuigan: Mine is in the basement for e milk.

Mr. Palmer: There is an average of two refrigerators per single-family household in Ontario, according to our appliance saturation figures.

Mr. Chairman: We will adjourn the committee until 10 o'clock tomorrow. We will pick up with demand management, or at least where we have left off on demand management.

The committee adjourned at 4:57 p.m.

CONTENTS

Tuesday, October 4, 1988

SELECT COMMITTEE ON ENERGY

Chairman: Carrothers, Douglas A. (Oakville South L)
Vice-Chairman: McGuigan, James F. (Essex-Kent L)
Brown, Michael A. (Algoma-Manitoulin L)
Charlton, Brian A. (Hamilton Mountain NDP)
Cureatz, Sam L. (Durham East PC)
Grier, Ruth A. (Etobicoke-Lakeshore NDP)
Matrundola, Gino (Willowdale L)
Ray, Michael C. (Windsor-Walkerville L)
Runciman, Robert W. (Leeds-Grenville PC)
South, Larry (Frontenac-Addington L)
Sullivan, Barbara (Halton Centre L)

Substitutions:
Lipsett, Ron (Grey L) for Mr. Brown
Lupusella, Tony (Dovercourt L) for Mr. Matrundola
Pollock, Jim (Hastings-Peterborough PC) for Mr. Cureatz

Clerk: Manikel, Tannis

Staff:
Argue, David, Consultant; with Passmore Associates International
Passmore, Jeff, Consultant; President, Passmore Associates International
Richmond, J. M., Research Officer, Legislative Research Service

Witnesses:

From Dow Chemicalanada Inc.:
Trask, Murray N., Vice-President, Manufacturing
Dukes, Don, Manager, Sarnia Division
Barnes, Dennis, Eastern Manager, Hydrocarbons and Energy
MacLachlan, David, Manager, Government Affairs, Ontario

From Ontario Hydro:
McConnell, Lorne G., Vice-President, Corporate Planning Branch
Palmer, Hedley, Director, Marketing Services and Development
Marriage, Art, Director, System Planning
Penn, Bill, Program Manager, Planning and Engineering Management Group
Snelson, Ken, Manager, Demand/Supply Integration
Rothman, Mitchell, Chief Economist

Ontario

No. N-25

Hansard
Official Report of Debates
Legislative Assembly of Ontario

Select Committee on Energy
Electricity Demand and Supply

First Session, 34th Parliament
Wednesday, October 5, 1988

Speaker: Honourable Hugh A. Edighoffer
Clerk of the House: Claude L. DesRosiers

Published by the Legislative Assembly of Ontario
Editor of Debates: Peter Brannan

CONTENTS

Contents of the proceedings reported in this issue of Hansard appears at the bacl together with a list of the members of the committee and other members and witnesses takir part.

Reference to a cumulative index of previous issues can be obtained by calling tl Hansard Reporting Service indexing staff at (416) 965-2159.

Hansard subscription price is $16.00 per session, from: Sessional Subscription Servic Information Services Branch, Ministry of Government Services, 5th Floor, 880 Bay Street, Toront M7A 1N8. Phone (416) 965-2238.

LEGISLATIVE ASSEMBLY OF ONTARIO

STANDING COMMITTEE ON ENERGY

Wednesday, October 5, 1988

The committee met at 10:10 a.m. in room 228.

ELECTRICITY DEMAND AND SUPPLY
(continued)

ONTARIO HYDRO
(continued)

Mr. Chairman: Can I call the morning session to order. I would like to pick up this morning where we left off. We have about three more hours to go through these points of discussion that the committee wanted to deal with. In order to make sure we do that, I am going to try to limit our discussion of each of the remaining topics to maybe 50 minutes or so. I propose to deal with the demand management for maybe 50 minutes to an hour, the independent generation for about 50 minutes, transmission impacts for about 45 and the nuclear for the remainder of the time. We have already touched on the comments on the greenhouse effect yesterday, I think, so I do not think there is any point in dealing with it separately today.

In order to make sure we get through that, I am going to ask everyone to be brief in his questions and answers and perhaps to keep them to the point. I will be limiting discussion at the end of the time period, so I just warn everybody. I hope that will allow us to get all of these items on the table and get a full discussion of them in the time that we have available to us.

That being said, let's pick up with demand management. I think the issue here, Mr. McConnell, is that a number of the witnesses, including the ministry, seem to feel that the target Hydro set is a bit low, so we would like to hear your comments on that, and perhaps more specifically what things you think might have to change in order to have a higher target.

We have asked about how you would intend to get over some of the institutional barriers, such as the fact, as we have heard, that many people buying refrigerators do not actually pay the electric bills to run them, because either they are building the house new or they are buying them for buildings they are going to rent out. We might want to talk about that very briefly.

Finally, we would be interested in any thoughts you have on the roles the various players would have–that is, the local utility, the Ministry of Energy and your organization.

Perhaps we could have some discussion for a few minutes, and then we will go to questions.

Mr. McConnell: I would be proposing to have Hedley Palmer respond to those three questions. Would you like Mr. Palmer to deal with all three briefly first?

Mr. Chairman: Yes, please.

Mr. Palmer: I suppose that to start off such a question, you will have to ask whether the totality of our expectations for demand reduction is appropriate. How does it compare with other jurisdictions? In order to help out with the answer, we have looked at targets being set elsewhere. I think it was Mark Twain who said there is nothing so odious as a good example, but we did look around at good examples, if we could find any.

I would like you to recall that Howard Geller, when he appeared as a witness before you, said that, on the average, those US utilities that have gone into demand management in all its forms were setting targets at about 0.7 per cent of penetrations per year–that is, a load reduction of about 0.7 per cent and ranging perhaps up to one per cent in utilities where the rates were fairly high.

If you look at the Ontario Hydro program on the same basis, you will find that the anticipated penetration is on the order of about one per cent between 1988 and the year 2000. I think we could say we are a relatively low-cost utility, so this program could be regarded as at least mildly aggressive.

We also looked at the situation in the Pacific Northwest, about which the committee has heard a considerable amount of evidence. In the 1988 plan put out by the Northwest Power Planning Council–and I think possibly that is the plan beyond the one you have seen; it has been published just recently–they show a substantial reduction in their targets; indeed, from 14 to seven per cent in the time period. The time period they are using is 2010–that is, from 1988 to 2010. They expect to reduce energy use by about seven per cent.

If you take our 2,000 megawatts of incentive-driven conservation in the time frame of 1988 to the year 2000, you will find that that works out to conservation of energy of about 6.4 per cent. The

Pacific northwest is now looking at seven per cent of energy conservation over the period 1988 through the year 2010. We are looking at energy conservation of 6.4 per cent in the period 1988 through to the year 2000. I think in that context our program can be regarded as quite aggressive.

I would also say to you in that respect that the Northwest Power Planning Council has included all efforts, including the force of its standards and codes and so on. In our 2,000-megawatt number we are talking only about those programs in which Ontario Hydro would need to pay a specific incentive in order to achieve results. I have not included such things as information-driven programs or load-shifting programs.

My conclusion, and perhaps not the board's, is that our program is fairly aggressive when you place it against other jurisdictions in North America. I base that at least in part on the evidence I have just given you.

What approaches does Ontario Hydro intend to take to overcome a range of institutional barriers? I think I would like to put to you once again that the 2,000-megawatt target does face a significant barrier inherent in the Power Corporation Act at the moment, in which Ontario Hydro has no authority to pay direct incentives to customers–that is, direct cash payments. That does permit us to provide low-interest loans and that kind of thing, which is certainly one form of incentive; but loan arrangements do have a certain amount, and sometimes a lot, of bureaucracy attached to them and are not the most convenient tool for an incentive, some sort of arrangement where direct cash payments could be made, where appropriate.

In respect to apartment dwellers, it is certainly clear that when you rent an apartment, the appliances are ordinarily supplied. They have been purchased in the beginning by developers and builders for those buildings, and the apartment dweller does not have much influence over that choice. I would certainly expect the way to attack that problem is the way the government is already intending to do it, by an energy efficiency act which will set standards for refrigerators and so on.

I would also caution you, though, that the effect of that act is not likely to be very significant for several years in the future, even though the government goes ahead with it quite aggressively in setting the standards. The reason is that refrigerators primarily are very long-lived pieces of equipment. Over time, the size of the refrigerator has increased magnificently. The ornamentation on it has increased magnificently in what it will do to meet customer desires. Even though the customer goes out and buys a very large, very efficient machine and installs it, he will likely be replacing a machine that actually uses less energy.

That is not an argument against an energy efficiency act, let me say, because in time what we will have installed in Ontario are highly efficient refrigerators, but it will take a long time. The speed of implementation of the act could be increased, I would think, by payment of incentives to customers, builders and so on, to go for the most efficient machines that are on the market. But first you have got to get those efficient machines on the market, and the market in Ontario is quite thin in that respect.

1020

Low-income customers: There has been a long-standing agreement in various forms between the government and Ontario Hydro that Ontario Hydro will not unilaterally go about programs that influence the redistribution of income. I draw to your attention that when the government wished to equalize rates between rural and urban customers, it had to put a piece in the Power Corporation Act that specifically authorized Ontario Hydro to do that and the form in which it should be done.

From Ontario Hydro's perspective, we believe that is the right role for government and the right role for Ontario Hydro. It is not for Ontario Hydro to decide how low-income, high-income and median-income customers are to be treated. We stick pretty close to our netting. We are a cost-based utility. We tend to make our rates and distribute the costs according to the best-accepted practice, on a fair and equitable basis in terms of use pattern, not in terms of income or social requirements of any kind. So we do not see in our future any initiatives by Ontario Hydro to have different kinds of programs for people of different income levels, unless the government so advises us or takes some role in that kind of question.

The final question on this list is about future efforts to achieve greater conservation and demand management, and in what preferred roles Hydro would see itself, the municipal utilities, the government ministry, etc., and energy savings.

Let me talk first about the government, perhaps the most important of all these players. I certainly applaud the government's intent to move ahead with the energy efficiency act. I think that is the proper role. I would like to see them look very carefully at building standards in

the province; that would achieve more efficient-energy buildings, particularly in the commercial sector. It seems to me that, generally, residential buildings are being built at quite a high standard, but in commercial buildings the field is still quite wide open. Certainly government funding for many programs is an important activity that the government should be involved in; also, the business of just providing a sort of ambience in which conservation activity makes a lot of sense. I think it is important for government.

Let me talk first about the municipal utilities, because we are very closely linked with the municipal utilities. Traditionally, we had very specific roles. Ontario Hydro provided the generation and the transmission, and the municipal utility provided the local distribution system. The municipal utilities expected that, as they needed more electricity, Ontario Hydro would make the appropriate plans to provide it and would deliver it to their door. The cost of that supply over time was equitably distributed across all utilities by the rate structure.

Demand management is causing some intermingling of those roles. It is causing Ontario Hydro to come to the municipal utilities and say, "We hope to get some of the need for the future from more efficient use of electricity among your customers." This places the municipalities in the position of saying to their supplier, Hydro, "Okay, if you are going to choose demand management as an alternative to building new supply and that is going to be more economic for everyone, you put up the money and the effort to provide the new supply." Essentially, you should do the same thing for demand management.

That is not an unreasonable position for the municipal utilities, in my opinion, because it is only in that way that we, as a wholesale utility, can continue to distribute the benefits of that equitably across all the utilities and customers in Ontario.

There are some local benefits. If we can get the same value for electricity in municipalities and still supply less energy, then the municipality will build less of the distribution system. They will have some direct cost benefits from that.

Between the two systems, the cost to the ultimate customer comes in this way: About 80 per cent to 85 per cent of the cost that you and I pay for electricity comes from the cost of running a wholesale system–that is, providing the generation and the transmission. The local municipal cost is of the order of 15 per cent to 20 per cent, so you would have to think that on a cost-sharing basis, this is the kind of ratio of cost-sharing that would make some sense. I think the point I am making with you is that if the municipalities are going to maintain a reasonable cost structure for their customers, they cannot afford to put up too much money in order to effect conservation in their own community.

If you sense some indifference to this from the municipal utilities, I do not think you should interpret it as that. I think it should be interpreted that they are somewhat unsure at the moment how this new relationship is going to work out to the mutual benefit of all customers. I think the ball is really in Ontario Hydro's hands to move forward with the municipalities with rational programs on energy conservation that will keep the municipal utilities whole and Hydro whole at the same time.

So there has to be some division of costs, some division of resources and labour. Again, traditionally, they have looked to us for expertise in many fields, obviously looking at Hydro in this field for the same kind of expertise and resource. I personally do not sense that they are opposed to demand management if it is an economic alternative to all the other things that you can think about.

So that is one of the roles of Hydro: to work with the municipal utilities to achieve effective results. Another role of Hydro is to generate the programs and find the market niches where energy conservation is to be the most effective. It makes a lot of sense to do the cheap stuff first and so on.

That about covers it.

1030

Mr. Charlton: I have some problems with some of what you have laid out for us this morning. I guess I basically have some problems with just the straight approach to comparing the numbers you have in your plan in terms of demand management to numbers in other people's plans, without also taking into account the need or the goal in those other plans.

The one specific example you used was the Northwest Power Planning Council. We had the Bonneville Power Administration here two years ago; we had a representative of the Northwest Power Planning Council here this year. They both told us and told us clearly that in their next planning period there will be no new supply options at all. So we have a power planning council and Bonneville Power sitting out there, as you have suggested, reducing their targets for demand management and conservation between now and 2010 because they do not need it.

We are being told here in Ontario that if we do not do something, we will have problems and that if we do not increase the numbers in terms of demand management, we are going to have to look at a major supply option in the planning period we are talking about.

I think to say we have 6.4 per cent and they have 7 per cent and that makes us pretty competitive is just not, from our perspective, acceptable in the context of that comparison. If you are going to compare with other plans, you have to look at what it is that other plan is targeting to achieve. You cannot just look at their demand management numbers and say, "Well, we're competitive with that." It is just not good enough.

Mr. Palmer: I think you are right. I hope I prefaced my remarks by saying one has to find some reasonable basis and it would take a long time to examine exhaustively all the programs that are in place in North America and the objectives for them and so on.

One remark I would make about the Pacific Northwest, since we have been very actively following that for seven or eight years, is that it is an energy-constrained system, as their witnesses make the point. They have just a finite amount of water and that water makes energy. They have based their program from the beginning on the fact that if they could reduce energy use in the Pacific Northwest through energy conservation, then any water they had left after that could be made into electricity and sold at an attractive price to other jurisdictions, specifically California. That was a very important part of their energy conservation program.

As the years have gone on, I think several things have happened there. First, the sales of energy to California at an attractive price did not materialize. It did not materialize basically because of the independent generation situation that developed in California.

The other thing that is evident from all the Bonneville reports is that penetration into the market was not nearly as extensive as they had anticipated. In part, they aimed their program at electrically heated houses, which they assumed were very ill-insulated. When they actually got into their programs, they found the situation was somewhat better than they had first anticipated, so there was less potential.

I think the reduction in programs has come about because some of the future that they first saw did not materialize and that was one of the reasons for their backing off. I think there is a significant lesson for us here.

Mr. Charlton: That is certainly not what we have been told by the representatives we have had here. Essentially, yes, they admitted openly that they have had to reduce some of their original expectations in terms of conservation, but my understanding of the kinds of figures they gave us says that has nothing to do with the target reductions in their present plan. The target reductions have specifically to do with need for power, in other words, their forecast.

We were told just three weeks ago that there are still considerable packages of conservation they have identified that are available out there that they are not at this time prepared to go after because they do not need them.

Mr. Palmer: The only thing I can say to that is that a kilowatt-hour saved is a kilowatt-hour saved for them. Their program, I keep making the point, is purely the need to save energy, because they have a finite amount of energy and they have not ever in their programs been concerned about the need for future capacity; they will run out of energy long before they run out of capacity, so they need to save energy. They have hit a unique program quite different from ours; I agree with that. The only other utility in demand management programs in North America, and only starting, which has a similar situation, is British Columbia. It, too, has an energy-constraint system.

Mr. McConnell: Mr. Charlton, you were suggesting in terms of the question you were putting to Mr. Palmer that the load in the northwestern United States would not grow because it would be totally contained by the conservation measures that were described. I have here a 1988 update, which was just issued. It is the draft report Mr. Palmer was talking about. Contained within that report are graphs of average megawatts starting in 1985 and going through to 2010. You can see that that is not a horizontal line.

Mr. Charlton: I was not suggesting no growth. What I suggested was that their plan contained no supply options.

Mr. McConnell: Okay. If there is a growth taking place and their median forecast for the period 1986 to 2010, which they have just issued, is 1.6 per cent, and their high growth is 3 per cent and their low growth is 0.3 per cent– I cannot say I personally know the detailed assessment of their supply situation. Obviously, if they have surplus power now that will meet that growth, then so be it; if they do not, they would certainly have to add capacity. But the fundamental point you are making, I believe, is incorrect. The basi

point is that their conservation program, which is in the same ballpark as ours, is not containing their growth.

Mr. Charlton: I never made that point. I repeat that. I never said at any point that there is no load growth in the northwest. I said they have got a planning perspective to 2010 which contains no need for supply options and that the reduction in their demand management has specifically to do with their need for power and not with their ability to deliver demand management. That was my point. My point was that it is not useful or constructive for Ontario Hydro to compare to their plan in that way and say, "We're competitive, having 6.4 per cent in terms of demand management and they have only got 7." They do not need the power and we do; that is what is inappropriate.

Mr. McConnell: It is my understanding that they are pursuing the maximum demand management they can achieve and that this is beneficial. There is always the question about whether one is comparing apples with apples. I agree that if you wanted to compare a utility in the United States with Ontario Hydro, you would have to examine in detail the opportunities that utility has to achieve an improved efficiency and compare it with the detailed opportunity we have.

Mr. Charlton: That is exactly what I am suggesting, and that is not what Mr. Palmer was describing.

Mr. McConnell: That is a very major effort, and we have during the period from 1984 to 1987 had extensive dialogue with the staff that work with the Bonneville Power Administration in which we have exchanged ideas. For those people on the committee who have travelled in North America extensively along the Pacific coast, I think you would find if you went to Victoria, Vancouver, Seattle, Oregon, San Francisco or Los Angeles, it would be rare for you to find a storm door or a storm window. There are opportunities that exist in electrically heated homes that represent good opportunities for improvement.

1040

There are lots of opportunities to improve, say, our homes in Ontario, to make them better, particularly in the face of our more severe climate. However, when we started the electrically heated homes in Ontario–that was primarily in the 1960s–we had standards and, relatively, they are much better.

Conversely, we could cite other examples in which our opportunities are better, but I think Mr. Palmer's comments are still fair, that when we just look at the bottom line in terms of the net effect, we are talking about as big a program as they are talking about. In fact, it is slightly more ambitious, because we are talking about the year 2000 and they are talking about the year 2010.

Mr. Charlton: It still deals with the question of need, but that is fair comment. You have responded.

I have just one other very brief question. I do not want to go through the whole range of comments again about removal of barriers, but what I would like to know is whether, in your opinion–any one or all of you can respond to this–it would be better for Hydro to be trying to take on the barriers to demand management that need removing or whether it is better done outside of Hydro, through government.

Mr. Palmer: I am not sure I exactly understand your question. There are certainly some areas where the only group in Ontario that can do something about the barriers that exist is the government itself. While other groups can influence the government–and I gave you two or three examples, typically in the area of standards, codes and so on–there are other barriers, cultural and otherwise, that Ontario Hydro can take on.

Mr. Charlton: I guess my point is simply this. We went through hearings two years ago where we had lengthy discussions about the barriers that exist to demand management and, specifically, to conservation. We went through hearings again this year where we heard from both Hydro in its opening presentations in August and a number of the other presenters about a whole range of barriers that exist out there. From my perspective, we went beyond the point of discussing the barriers and started hearing some specific recommendations about how to overcome them. I certainly would like to see from Hydro at some point a package of comments about those things that Hydro feels it could best do to get at the barriers and those things it feels are beyond its control to deal with and that government should probably be directly involved in.

You have made some comments about standards. We gathered that much from the hearings two years ago. That is why we made the recommendation that the government implement standards. We are proceeding with that, but there is a whole range of other barriers that have been discussed and there is still nobody making specific comments about how to get at some of those barriers, some of the financial ones, specifically.

Mr. Palmer: I could suggest at least one other barrier in our 2,000-megawatts target. I think this target is extremely ambitious, and it is endangered somewhat by the fact that there may not be sufficient commercial infrastructure in place in Ontario to achieve this target by the year 2000.

I will give you one single example. There are approximately 400,000 electrically heated homes in the province. We have had some very careful audit work done on a statistical sample of those houses. We now know the kinds of initiatives that would be required to improve their efficiency performance. It represents about a one-kilowatt reduction in peak requirement per home; that is, about 400 megawatts of reduction in peak requirement and the corresponding amount of energy if all 400,000 were serviced. Between now and the year 2000, that would represent a program of nearly 40,000 homes a year.

We have carried on some discussions with the building industry and other major players in this area. We are left with the definite impression that there are simply not enough people out there in the community with training to do this kind of work and skills to carry on that level of program in that time period.

Mr. Charlton: As I said, I do not want to go through the whole discussion of the barriers question again here today. We have a lot of things to go through. But I just refer you to some of the material that was presented to us in August. We have got strategy element 3.11, "Ontario Hydro will identify other barriers to increased efficiency and work with other parties, as appropriate, towards the reduction or elimination of such barriers."

Essentially, that is precisely what was being said to us two years ago. Although it was not in your presentations, in response to the things we raised two years ago, Hydro said, "Yes, we'll work at identifying barriers and yes, we'll work with anybody to eliminate them."

What we want to see are the specific suggestions about programs and methods of eliminating those barriers. We do not want to be seeing this packaged phrase from now until 2010, not knowing what we might have accomplished if we had developed some programs in consultation with Hydro, the government and some of the other players in the energy system.

Mr. McConnell: I guess, very quickly, we could simply say we agree that the identification of barriers, getting at the roots of those barriers and formulating a definitive process for overcoming those barriers, as you have just said, is a stated part of our strategy.

You will recall that if you take the specific presentations that Mr. Comissiong had made here–I do not know whether you were here at the time that those presentations were made–he did, as I recall, talk specifically about the question of analysing the barriers having to do with apartments. Mr. Palmer has reminded us this morning that in that particular instance the analysis found that our ability to influence the situation was very limited by dealing directly with the ultimate consumer in that case, particularly if the apartment was owned by a landlord.

Even in the case of a landlord, we had indicated to you that the decision-making often preceded the landlord and it had to do with the infrastructure that Mr. Palmer has just referred to, where we have to get back to the roots of the thing and deal with those. All the way down the train you have to be dealing with the consumer, you have to be dealing with the landlord and you have to be dealing with the people who are designing these buildings in the first instance and formulating those incentives.

Mr. Charlton: Okay, that is all fair. This is my last comment, Mr. Chairman. What we need to start the process in operation is Ontario Hydro saying, loudly and clearly, "We think there are significant energy savings we can make in rental apartments." Ontario Hydro can figure out no way for its corporate structure under its present legislative mandate to get at that problem. Government is going to have to take that on and perhaps even provide some financial incentives to those landlords to do the job.

If Hydro will say that, it is something government will then take notice of. It may act on it and it may not, but at least, once it is said clearly to the ministry, then we have something in the political arena we can go after. But if it never gets said, if all we do is identify the problem and say, "Landlords are hard to deal with directly," you see what I am getting at.

1050

We need Hydro to say: "Look, there's a problem. There are major energy savings there we could get at theoretically, but Hydro can't figure out a way to get at them." That is what we need you to be saying loud and clear to the government: "You guys are going to have to do something if you want us to be able to deal with that one."

Mr. McConnell: Not to prolong this discussion, I think our strategy is very clear in that we are saying the standards are in your court. We

have said very clearly that we have been working with the federal government for over 10 years in helping it to develop standards and we are quite prepared to work with the provincial government and the federal government to help to develop those standards and make them meaningful in the future.

In the case of apartments, we are saying that when it comes to refrigerators, microwave ovens, stoves and that kind of thing, they are best tackled on the standards basis. That was in our presentation. We were not saying we did not have opportunities to tackle other issues when it came to such things as efficiency of the insulation in the buildings and so on. We intend to be active and that was stated in our presentations.

Mr. Snelson: Can I make a clarification about the Bonneville Power Administration, the Pacific Northwest? The question has been asked about whether they need new supply before the year 2010. Their resource plan, that new plan, has substantial quantities of combustion and combined-cycle turbines in two of the four scenarios they have analysed. They have four different load-growth scenarios which they look at, and two of the four require substantial quantities of new supply in that time period.

Mrs. Grier: Can I just get a little bit clearer how long Hydro has been looking at demand management? From what Mr. Palmer said, I would take it that since 1984 you have been dealing with Bonneville or discussing their projects.

Mr. Palmer: Yes.

Mrs. Grier: Is it fair to say that for the last four or five years demand management has been a priority or at least a concern of Hydro?

Mr. Palmer: The corporation has put quite a bit of money into programs designed to research and test activities that might be helpful in demand management. I think a consistent message from all over North America, from jurisdictions which are in it and from observers of demand management programs, is that one thing a utility must do before it plunges into programs that look good is some testing and evaluation. We have had some major undertakings under way in that respect.

Mrs. Grier: You have said in the submissions to us that your target by 1993 was 576 megawatts, I think.

Mr. Palmer: Yes.

Mrs. Grier: I am trying to understand over what time frame that is. Is that from 1984 to 1993, or when do you see that period of savings as being?

Mr. Palmer: As we have presented the figures to you from the current year and we are talking about 1993 as the end period, we are talking about from now until 1993.

Mrs. Grier: So you would say you are starting demand management seriously now and by 1993 you will have saved almost 600 megawatts.

Mr. McConnell: Each year in December or just after December, we get a new benchmark of what the load actually is, and the target we would generate would be from then on. So it is a moving target. Each year you are sort of looking on into the future as to what more you can do.

The question you have asked is an extremely good one, and I would just like to take a few seconds to remind you of the situation we were in in 1984.

Mrs. Grier: Perhaps if I give you my supplementary question, that will focus your answer on what I am trying to find out. You have essentially agreed that in your first five years, 1988 to 1993, of demand management, you are going to save about 600 megawatts. You have given us the comparison of your performance with respect to the Pacific Northwest. How much did they save in their first five years of demand management? They started in 1978. Can you make a comparison of what you were doing in this period with what they were doing?

The point I am making is that they have been into demand management now for 10 years. Is it not fair to assume that it is much easier to make a saving in your initial stage because the easy things get done first? Is it therefore fair to compare their target over the next five or 10 years with your target now, given that you are starting now and they started 10 years ago? If you make that kind of a comparison, what do the figures show?

Mr. Palmer: I have to recall from memory here, but the Bonneville Power Administration put out a report each year doing an evaluation of demand management. The most recent report that I saw was for the year 1986. That is their program up to the end of 1986. My memory tells me that their performance or success was in the neighbourhood of somewhat less than 300 megawatts.

Mrs. Grier: In 1986?

Mr. Palmer: Yes.

Mrs. Grier: And since 1978, how much have they saved?

Mr. Palmer: That is the total from the start to the end of 1986.

Mrs. Grier: I see. So in their first eight years, they have saved 300 megawatts.

Mr. Palmer: Yes. I believe I am correct in the number within a few megawatts.

Mr. McConnell: To respond to those two aspects of the question you were asking, I indicated that when we started our study in 1984 and, as you have correctly pointed out, the program in Bonneville was already under way, we went to the people there for help and asked them questions.

In 1984, Hydro was in a surplus situation. You may recall that we were being told we would never need any more power supplies. We went through a select committee hearing as to whether we needed Darlington or not. We had a situation in Ontario in which the public, initially, was not all that clear as to whether it wanted us to get into an intervention process of taking money from one customer and handing it to another customer, because that is effectively what we are doing with demand management. We needed to clear the air. We needed to know how the people in this province felt. So you are quite correct in saying we did not make major strides in terms of implementation.

But I think we have made major strides in clearing the air and finding out how our Legislature feels, how our government feels and how our public feels generally, that we feel we are very much on board. In the interim period, of course, the loads, as we described to you, had grown very rapidly. It was imperative that we get on with it. Our program is under way and the time-of-use rates are already coming into effect at the beginning of this year.

The situation compared with Bonneville was that in terms of the starting year in 1988, its opportunities are still equal to or better than ours because, in fact, Ontario had made a lot of progress in demand management starting back many decades ago. I agree with you that you have to compare the opportunities, but I think the opportunities from 1988 on are still as good for them as they are for us today, because we had done a lot of things back in the 1960s that I described to you before.

Mr. Palmer: I want to supplement my answer very quickly.

Mrs. Grier: I have just been cut off by the chairman so I do not have any more questions.

Mr. Palmer: The committee has a report in its hands from the Northwest Power Planning Council covering the period 1981 through 1988. That report, I understand, gives some of the numbers you were inquiring about.

Mrs. Sullivan: I wanted to move more into the area of the approvals process and time process. It seems to me that with 12 years of time elapsing between the period when you are starting really to be into the field of demand management and the time when you hope to achieve 2,000 megawatts of savings, there are going to have to be substantial changes in what is possible for Ontario Hydro. First of all, I would like to know if you agree with that.

1100

You have mentioned the Power Corporation Act limitations on providing grants, but I wonder if there are other factors relating to Ontario Energy Board decisions that might affect use of rates, for example, for regional incentives, programs that could be used in one part of the province more profitably than in another, where you might set a formula that would have a substantial effect on rates, as was done in some of the American situations where they allowed a 10 per cent cost advantage to conservation. I would like to explore the approvals process and see what else you need to get going.

Mr. Palmer: First off, I had not considered the OEB to be a barrier. It is true that we have to take our wholesale rates to them each year if the minister so requests, and he always does, and they make certain recommendations in respect to those rates which our board is expected to take into account in determining the ultimate rate level. It is true that you could foresee that the OEB might make some recommendations that would be contrary to some of the suggestions that you have made. It is then up to the Hydro board to decide how it is going to respond to that.

In the current year, for instance, the board made some recommendations in regard to cost-based rates that we had developed which still had applications in some parts of the province, in particular in the pulp and paper industry, and the board has recommended against our proceeding with that. The Hydro board will have to give that considerable thought and make a decision on whether it will continue with that or not. In its present relationship with Ontario Hydro, I do not see the OEB at all as a barrier to successful demand management.

Mrs. Sullivan: What about the Power Corporation Act?

Mr. Palmer: The Power Corporation Act has some things in it now, or does not have some

hings in it, and one is–let me start in a different lace.

Some time just in the late 1970s, there were ome changes made in the act relating to energy onservation. Those changes gave Ontario Hydro specific authority to provide low-cost loans, nd they have their place, an important place, in lemand management activities. Most utilities lsewhere, though, are in the spot to offer direct ayments for various kinds of conservation ctivity. It is the opinion of our legal people and utside advisers that we currently do not have hat authority and we have not been doing it as a esult of that.

I think that is a significant barrier, particularly or small payouts. If you want to pay out $25, ou do not want to give someone a low-cost loan or $25. There is a lot of machinery that goes long with making loans, although we would areful about that; our loan program is handled y one of the major banks. They consider the risk nd so on and we simply write down the interest ate for them at whatever we agree is the amount. Ve avoid the major administration of the rogram, but still, it is kind of a left-handed pproach to a lot of conservation activity. That is he single most important area, in my mind, vhere the act is somewhat restrictive.

Mrs. Sullivan: Could Hydro now impose a enalty or a disincentive, for example, if a new uilding were constructed not using efficient echniques?

Mr. Palmer: No, I do not think so. I do not hink we have any authority in the act to do that ind of thing.

Mrs. Sullivan: Does Hydro have the authority ow, for example, to allow incentives in certain egions of the province that would not be applied n other regions of the province?

Mr. Palmer: No. I think the act is totally ilent on the question you are asking. There is no nstruction to do it; there is no instruction not to o it. Generally, our legal people interpret that ind of situation as the corporation having uthority to do only those things that the act tells to do. It does not have authority to do things the ct is silent on, because that is sort of slipping hrough the cracks of the act.

Mrs. Sullivan: Is it your view then that you ould do much better in your conservation rograms were the act to be changed?

Mr. Palmer: Certainly, in the way of the irect incentives I think that is important. I am ess concerned about offering disincentives. This a consumer-driven society, and it would be very difficult to implement in actual programs, in my opinion, to make those regional choices and so on. I am speaking very personally now. There may be other views.

Mrs. Sullivan: I am trying to identify what else you need to get there, given a short period of time to achieve what Hydro has identified as a reasonable goal, which the minister says he is disappointed in, and given the process that you have to go through to get to the final achievement of the goal.

Mr. Palmer: Let's speak about the minister's disappointment for the moment. The minister specifically talked about our information-driven programs, that particular goal. In a sense, that was our best estimate of what people would do out there, given the totality of the marketplace, the society in which they live and the technological change that will take place.

It was not so much goals as what we hoped was a responsible estimate. It would certainly be possible for the government and the minister to speed up some things in the way of codes and standards that are included in that goal. Ontario Hydro is also mounting major programs that accelerate the information flow. It is just customers making the right choices.

It seemed to me it was that kind of thing that the minister was somewhat sceptical about, and our president has had some exchanges with him on that since that time. I personally think if this province manages the 2,000 megawatts in the next 12 years, it deserves a Nobel prize. That is my candid belief. It is going to require all parties to this action to do everything within their power to make it happen.

Mrs. Sullivan: I was interested when we had both individual municipal utilities and the Municipal Electric Association appearing before us. One of the things that quite struck me in their presentations was concern about the regional implementation or their own implementation of the programs. Many of them said basically, "We want the freedom to choose what is best for our area." I wonder how Hydro sees that in terms of an overall conservation program.

1110

Mr. Palmer: Let me be quite candid. There are 20 municipal utilities in Ontario that take 90 per cent of the load. The other 300 make up 10 per cent of the load. If one were an out-and-out, hard-nosed businessman, one would forget the 300 and work with the 20 major utilities in the province.

As a quasi-governmental institution, a statutory corporation, it is not quite possible for us to take that point of view. We must provide programs to all municipalities. They are all our customers and each of them, despite its size, is important.

If you look at the 20, and I think you could probably name them, they are, with one or two exceptions, almost entirely limited to within 50 miles of where we are sitting. If 2,000 megawatts is to be achieved, nearly all of it has to be achieved within those utilities because the others often do not have much to give.

Mrs. Sullivan: Given that, then your programs are basically going to be designed, although they will have to be delivered everywhere, for that particular area.

Mr. Palmer: Do not think we are not able to provide some modest differences in programs from place to place to suit the local situation. We accept that as being a part of our mandate and the reality of the situation. We do not believe that a program which will go well in the city of Toronto will go well in the same form in North Bay or in Kapuskasing. We will have programs in northern Ontario that do not have any relevance in Toronto. There are more electrically heated houses, for instance, throughout the northern part of Ontario than there are in southern Ontario, and they will be an important part of our programs. The program we develop will have to be suited for electrically heated houses and the concentration of that program very well will be directly related to the colder areas of the province.

Mr. McConnell: To add to that, we have indicated that to make these things happen we have to take money from all customers and we have to allocate it to those customers sharing in a specific incentive program. I think we have communicated to you that it is important that whereas certain customers may benefit from a certain program, we need to have a wide menu and a portfolio of opportunities so that everybody is being seen as having the opportunity to share in the benefits of demand management, if it is their moneys that are being taken to support that program. I think it is also important for that reason that we are not seen as just concentrating on the 10 per cent Mr. Palmer was talking about.

Mrs. Sullivan: I have a sense that there is not a sense of urgency in the community about conservation. People do not believe there is a problem and will not believe there is a problem until there is substantially more communication effort from Ontario Hydro. That may well underscore some of the actual incentive programs, but without that communication effort occurring now, it is going to be far tougher to achieve the demand reductions.

I also have a sense that unless there are very strong measures taken by Hydro, including incentives such as were undertaken in other jurisdictions, the sense of urgency will not be underlined. That is why I am asking the questions about what you are now able to do in terms of effecting a program.

Mr. Palmer: I have tried to communicate to you some of the municipal uncertainty that exists now. I have very strong confidence that they would proceed vigorously with programs we introduce if we made the appropriate resources available to them to work vigorously to implement that particular program. By resource commitment I mean they may need expertise, they may need actual people and so on. I think we have to do that to get these programs to go. We have the authority in the Power Corporation Act to provide that kind of expertise. We are not hung up. There is no barrier from the legislative point of view. We have not quite got around to doing that yet. Where we have been running test programs, and we have had quite a few of them go, they are in municipalities and we are getting excellent co-operation from the municipalities. I would remind you that they have a limited amount of money to put into it to justify their doing so on a purely local basis. The real bucks in this business are in generation and transmission and that is essentially Ontario Hydro's responsibility, a mix between the municipalities and ourselves.

Mr. McConnell: I guess if you stop to think, Mrs. Sullivan, about you and your own home you could ask yourself the question, do you want Ontario Hydro to enter your premises and mandate that you make certain changes? I think the answer is that you would be pretty careful about what you wanted us to do and to force people to do. When we went out with a public survey we found as a pretty overwhelming response that people felt that there was an opportunity for efficiency improvements, but you do get into the situation that, "The opportunities are everywhere else but me, I am doing a good job."

We fully agree that we have to do a lot more by way of promotion and information programs and incentives. We have said that standards, in fact, are a form of mandated process and we have said that is a role for the government. When it comes to such things as, "If you don't do this, we will

charge you an extra rate," I see no reason why we cannot do that if the government decides in its wisdom that is what we should be doing. I think we need some policy direction if you wanted us to be given that kind of authority and to behave in that kind of a way.

Mr. Runciman: I wanted to talk a little about the municipal utilities as well, perhaps with a slightly different angle. The municipal utilities that appeared before us all admitted to almost constant efforts at expanding market share, which seems to be in conflict with what we are talking about during these sessions in terms of reducing demand. I am wondering if it is not worthy of consideration, either through an incentive program, placing targets on municipalities, a system of incentives or disincentives–perhaps a combination of both–to discourage the ongoing efforts of municipal utilities to increase market share.

Mr. Palmer: I would take some issue with that, I think, Mr. Runciman. It seems to me that most utilities here in Ontario in the last three or four years have just been driven almost to the limits of their capability to supply new load, to meet the new construction activity that is going on in their utilities.

Mr. Runciman: Well, that is not the testimony that we have had before us. The fact that there is a new subdivision going into an area, the utility has someone out there trying to sell them electric heating for the subdivision, that sort of an approach. I am just wondering if it is something that should not be reassessed. Perhaps Hydro is the body to be doing that sort of thing. Obviously you disagree.

Mr. Palmer: Yes, I do and I am not saying in my disagreement that all 320 municipal utilities are on a strong demand management kick. There may be one or two exceptions to that. After all, they are their own people. They have elected commissioners, for the most part, who tend to reflect the community's culture and belief.

1120

Mr. Runciman: I understand all that. The point I am suggesting is that perhaps–I am sure you suggested, too–not all of the utilities are involved in demand-management programs. Certainly the testimony we have had, although limited, has indicated that some of the major ones, North York for example, are out there trying to market the product. I am suggesting, would it not be appropriate to have some sort of program in place for either incentives, or a combination of incentives and "disincentives," to encourage municipalities to get involved? Those utilities that are not participating, are not actively making efforts in respect to demand management.

Mr. Palmer: I suppose there might be a role for that, and certainly that is not a role that we have at this time.

Mr. Runciman: I am aware of that. Have you no comment beyond that?

Mr. McConnell: If there is an energy application in the province, and that energy application is most effectively met with gas, then I think it should be met with gas. If it is most effectively met with electricity that is produced from coal, uranium, water or gas or whatever, then I think that it is appropriate that the province meet its needs by using electricity.

When Mr. Franklin appeared, you will recall in his opening remarks he went out of his way to say that we are not, in fact, promoting market share, that what we are talking about is three programs using energy efficiently, using electricity efficiently and trying to shift our peak load so that we will have less capacity installed. Third, we had presentations made to you that talked about trying to make Ontario more efficient through electrotechnology.

You are raising the question about the behaviour of the municipal utilities at the moment. I am simply trying to clarify that our position is not one of promoting market share, and that in providing leadership to municipalities, you are certainly taking the posture of encouraging them, in their program, to be using energy wisely.

Mr. Runciman: All I am suggesting is that perhaps consideration should be given to more actively pursuing that, based on the limited testimony, granted, that we have had before us during these hearings.

I know this is something you mentioned, too, in the DSOS, about the question of instituting a conservation program simply aimed at electricity consumers. I am wondering if it does not, in some way, diminish the effectiveness, if Ontario Hydro gets involved in the rather significant program to try and conserve electricity. Does that not also have an impact on encouraging more use of electricity as well?

I am wondering if it is not more appropriate for the government to be looking at a broader kind of policy affecting all kinds of energy consumption and conservation efforts, rather than simply zeroing in on this one element. I think that we as a committee, and the government, have to take a look at the bigger picture. In fact, that may have

more of a beneficial impact in terms of demand management than solely going after electricity.

Mr. Palmer: You are talking about all energy.

Mr. McConnell: I think that Mrs. Grier and Mrs. Sullivan both raised that question: that if we come out with these high incentives, could we be in a position where, in fact, we make it so attractive that we are just inducing people to switch from another form of energy to electricity? I believe that question was put to Mr. Litchfield. My recollection, although I would have to go back and check Hansard, is that he acknowledged that was a risk. I believe it was you, Hedley, when we talked about the strategy, who cautioned this committee that we felt that if we were going to offer incentives, there needed to be a stake on the part of the recipient.

If a company, say, knew it was going to pack up a factory in three years, if it happened to have an electric motor that ran at 92 per cent efficiency we could go out and buy a brand new motor that ran at 96 per cent efficiency and install it, only to be embarrassed three years later when the factory packed up. In order to make sure we were not going off half-cocked and inducing all sorts of electrical demand through such positions, our strategy calls for a participation in that incentive process.

Mr. Runciman: The Ministry of Housing, dealing with apartments, referenced–this is also on the question sheet–apartment dwellers. It has recommended consideration of a grant to recover capital costs to the landlord versus the suggestions and proposals you have made in that the landlord could recover that through the rent review system. I just wanted to suggest that you also take a look at the backlog with respect to rent review. We were told last night it is something like 80,000, so I am not sure how many landlords would be encouraged to get involved in a recovery system when they are facing that kind of backlog of individual applications.

The other thing I am curious about–I do not think it has been discussed at the hearings and I do not know how significant it is, if it is at all significant–is the question of daylight saving time. We have heard that talked about over the years and when we were in the energy crunch a few years ago there was an extension of the daylight saving time period. There have been several private member's bills before the Legislature dealing with this over the years. Has Ontario Hydro taken a look at the impact that might have if it were extended on a full-year basis?

Mr. Palmer: On a full-year basis, I suspect it would not produce any result much different from standard time on a full-year basis. As we generally change from summer to winter in the time at the end of October, we tend to get a sharp peak immediately thereafter, because before you move you are sort of in the daylight along in the late afternoon, and when you make the change back to standard it is suddenly dark and the lights all come on and the office buildings are not quite closed yet and so on. But that is a peak at the time of year that is not influential for the total peak of the system that comes later on. It does not occur until perhaps December or January-February. The fact that we get a step effect at the first of November in many ways is neither here nor there. I do not think whether we run all year on standard time or all year on daylight saving time would make any significant difference in energy and demand on an annual basis.

Mr. Runciman: So the government's extension of it a few years ago was essentially a meaningless gesture?

Mr. Palmer: I really cannot respond to that.

Mr. McGuigan: I am not aware of your advertising program now, perhaps because you are not doing much of it. Many years ago there used to be, "Hydro is yours, use it." What sort of institutional advertising are you doing at this time?

1130

Mr. Palmer: Would you let me have that question again?

Mr. McGuigan: At one time you had an advertising program that said: "Hydro is yours. Use it." You were encouraging the use of hydro. I know you dropped that many years ago. What sort of advertising do you do now? Do you do any advertising?

Mr. Palmer: Yes, we do. All of the advertising we have currently is directed towards demand management or demand reduction activity. We have very limited television advertising at the moment, but there are some spots. They all have very strong demand management reduction. We also have advertising in commercial and trade magazines directed at industry and commerce. They are all directed towards energy efficiency.

Mr. McGuigan: You mentioned earlier that one of the worst wasters was industry. Do you advertise in trade magazines a specific message to industry?

Mr. Palmer: Yes, we do. Much of our trade advertising quotes examples of energy saving in specific industries, specific companies or

specific segments of industry. That is our general thrust.

Mr. Argue: There are many questions that come out of this discussion this morning, but I will restrict myself to one question based on the time that we have allotted.

In reviewing Hydro's discussions on demand management, a number of key phrases seem to come up. One is "best estimate." Another quote is, "We have not quite gotten around to doing that yet."

I am wondering, in looking at your program, whether you are satisfied with the sophistication of your research and investigation into exactly what that market is, based on some of the information presented by Mr. Litchfield from the Northwest Power Planning Council, which goes into several different areas, breaking them down by sector, and the ministry's study done by Marbek Resource Consultants.

I would like your comments on that and how we could get a little bit more detail on how the programs would break down over the longer term.

Mr. Rothman: I would like to answer that. We had, before Marbek did it, a study that detailed strategic conservation potential by sector. We produced curves very much like those of Marbek. Marbek, in fact, used some of our results in producing its study. We know Marbek's suggestion of potential is somewhat higher than ours, but we have gone back over that study and we even have a pretty good idea of what the sources of differences are.

I do not think it is true that we have not been looking at these questions, that we do not have ideas of what programs are possible or that we do not know what kinds of relative costs there are for programs by sector. We have quite a good idea of that, and we have reports. I have a summary report which was produced by my division in May 1987, a strategic conservation summary report in the commercial, industrial and residential sectors. That report is a summary of individual reports for each of those three sectors.

Mr. Argue: What year was that done in?

Mr. Rothman: May 1987. So we in fact did that work in May 1987. It is now over a year old. The underlying studies are a little older than that. We would like to be able to do more research along that line, but it is not true that we have not done any. It is not true that we are not aware of much of the kind of material that, for example, the Ministry of Energy and the Marbek study talked about.

Mr. Argue: Mr. Snelson, I am wondering then, with the level of sophistication that Mr. Rothman has spoken of today, which is available to Hydro in looking at demand management, why in your representative plans, first of all, you broke down demand management by only four general categories–retrofit conservation, retrofit conservation heating, new conservation heating and new conservation general–and that the implementation of that demand management was very flat over the study period?

A supplementary which I presume will follow from your answer is, how do you intend to make changes when you come forward with definitive plans on dealing with demand management programs?

Mr. Snelson: The assumptions that went into the representative plans were based on the best information that was available in the corporation at that time. The assumptions that will be used in preparing definitive plans will be based on the most detailed information that is available at the time the definitive plans are prepared. They will probably show more detail. There is regular communication between my staff, Mitch's staff–that is the economics and forecast division–and the energy management branch and we are well aware of the detailed programs that are being planned to be implemented.

Mr. Palmer: First off, Marbek, like ourselves, made studies of the potential that might be achieved, the world being perfect. We have no quarrel with those numbers.

The next thing to do is to find out what is achievable, and much of our test program and work has been trying to established what is achievable from an economic and other factors. For instance, we have done, as I have mentioned before, a 1,000-home audit of residential customers throughout the province to tie that down much more closely than we or Marbek were able to do earlier.

We now know what the potential is and what it is likely to cost. Those are important further steps that we have been taking.

Mr. Rothman: Again, I just want to point out that the Marbek study talks about potential; it does not talk about time lines. It is very difficult to go from that study to knowing what in fact can be achieved, because their numbers are not time-specific. In ours, we are looking at the year 2000 specifically, because that is where our time horizon was.

Mr. Chairman: Thank you. Perhaps we can now move on to the next item, which is independent generation. Mr. McConnell, I think

we may just veer a bit from the points put in our questions and focus on what may be the key issue here, which seems to be avoided cost and what that might be.

We have heard from some witnesses who think the avoided cost to your system might be higher than what you are indicating it would be. If I understand correctly, your avoided cost seems very similar to the wholesale cost or something below what your wholesale cost would be. We have heard some suggestion that perhaps the cost of new generation would somehow be higher than that. I wonder if you might comment on what has been said relating to avoided cost here. Maybe you will go for about 10 minutes and then have about half an hour of questions on this area.

Mr. McConnell: You would like us to respond exclusively to the issue of avoided cost?

Mr. Chairman: I think just the avoided cost. It seems to me that is the nub of the issue here. Why do we not deal with that first and then have a discussion?

Mr. McConnell: That being the case, I would like to call on Mr. Snelson to respond.

Mr. Snelson: You have heard a lot of things about avoided cost. You have said in your opening remarks that you have had evidence that it should be based upon the costs of new plant rather than costs of the existing plant. I can reassure you that our avoided costs fully include the cost of new plant. That is the basis for estimating it.

You have to be careful in this sort of evaluation to avoid the pitfall of comparing to the cost of a new plant in its first year in service. What is relevant is the average cost of a new plant over its lifetime, and that is the basis that is included in our avoided-cost calculations. If you go with the cost of a new plant in its first year in service and you use that every year, you will end up, in total, paying a lot more than the cost of new plant. That is one of the pitfalls that has to be avoided.

You have heard that our avoided cost does not include transmission costs. It does include transmission costs. It has always included some transmission costs, and the 1987 issue had costs in volt power transmission.

1140

There are real questions surrounding the appropriate rate that should be charged for capital, the discount rate that we talked about at some length yesterday. I just want to reiterate that our discount rate reflects the cost of money to Ontario Hydro.

There are other questions that are raised. I cannot go into all the details in the short time that we have, but I would like to make it clear that we have made, as far as we can, the best estimates of what the costs that are avoided by independent generation would be by having a look at the power system, how it is operated, what sorts of new capacity could be avoided and when.

Based on the evidence you have heard and this sort of discussion, I think you might be justified in tending towards the conclusion that this is a complex issue in which there is a considerable amount of misunderstanding. I find that issue paper 4, which you have in front of you, tends to reinforce that conclusion, because it has a considerable number of factual errors and misunderstandings incorporated in it. I suggest you use it with some caution.

Janice Hamrin, in her evidence, suggested to you that a lot of discussion in front of commissions, boards and so on, about avoided cost ends up looking at what happens in the second and third decimal places of avoided cost, looking at the minutiae of methods. She was suggesting that was not the problem. The problem we had to look at was, is it in the right ballpark? Is it three cents or is it six cents?

You have to look at the overall level. There are some checks and balances that our methodology has been through, and I am confident that our figures are at the right general level. There are other methods that can be used which will produce reasonable numbers. If they account for the operation of the system and the actual capacity that one is likely to avoid in a correct manner, they will come up figures that are in the same general ballpark.

Some other means of checking it, which may help to give you some confidence, are that our avoided cost is shown as being in the 3.5- to four-cent range. That is considerably above the levelized unit energy cost of a nuclear plant, and that is something that will be examined in detail in front of the nuclear cost review that is being proposed.

Calculations have been through many levels of technical review internally, among professional engineers, through the papers that we have published in the IEEE–that is, the Institute of Electrical and Electronic Engineers–and by an independent consultant whom we hired. He was a reputable consultant and gave us an opinion that, if anything, our values were towards the high side of the reasonable range.

You can also look across Canada and you will find that our avoided costs and our buyback rates

are among the highest in Canada. There are sensitivities to discount rates and to the mix of capacity. We have talked about having to choose the lowest-cost alternative with which to make your comparison; otherwise, you will find out that the avoided cost of riding a bicycle is riding behind a taxi instead of riding behind a bus.

There are real issues in here, but you have to choose the right sort of capacity to make the comparison with. You should make the comparison with the average cost of new plant of its full lifetime, and there are real questions surrounding what future fuel prices will be. We have made our best forecasts in those areas. There are sensitivities, but we are confident that our numbers are in the right general area.

Mr. Chairman: Maybe I could ask one question before we go on. It may reflect my misunderstanding of the issue. It seemed to me that the avoided cost you are talking about is very similar to your wholesale rate. I would have thought that the cost of new electricity would be higher than that because that wholesale rate would have taken into account all of the lower-cost facilities you have that produce power. I am just wondering if you could explain. Maybe I have misunderstood it, but that seems odd to me and I am just curious why the wholesale rate and this rate seem so similar.

Mr. Snelson: I think the point that is missed is that, taking a plant like Darlington, the average cost over the lifetime of Darlington power is not above our wholesale cost. The cost of Darlington power in its first year in service is above the wholesale cost and will be in the order of six or 6.5 cents a kilowatt-hour. But there is a phenomenon in here that is like when you go out and buy a house. When we go out and buy a house we are very often prepared to take on mortgage payments that are higher than we would have paid in rent. The reason we do that is that we know the mortgage does not go up with inflation and that, over a period of time, that mortgage payment becomes easier to handle.

The same sort of phenomenon occurs when you are building a new power plant. Because of the effects of inflation and because of the effects of our depreciation policy in writing the plant off very quickly, a new plant tends to look expensive in its early years and cheaper in its later years. The proper comparison is with the average cost of the plant over its full lifetime and new nuclear plant is not at a higher cost than our bulk rate. A new coal-fired plant might be about the wholesale rate.

Mr. McConnell: I think as evidence of that we had presented you with a graph that showed that from 1950 to now, contrary to popular opinion, the real rates, as distinct from the inflated rates, were sensibly constant. That is unique to Canada. If you go to the United States, of course, they have had quite a large increase in terms of real price. They have had a different situation where their marginal costs have been higher than their average costs. We project that if we are given the opportunity, we will continue to keep the rates down.

Mr. Palmer: There is another factor that you have not mentioned. That factor is that in operating a utility there are more than generation and transmission costs, which are essentially the side that avoided cost looks at. You have to service the customers, you have to bill the customers; we run a major research division which comes out of the cost of power, or much of the cost. Many other services and activities in a utility are not related to generation and transmission supply and they have to be factored into the price you charge. That is another consideration.

Mr. McConnell: If we buy power from a private generator and take that into our power system, we still have to pay the costs of transmitting and distributing that power to the consumer. That is different from the private utility generating its power to meet its own requirements. Then it obviously can be trying to avoid the full rate that we would charge for generating, transmitting and distributing. We buy at its value to our customers.

Mrs. Grier: Before you get into questions, if there are in fact factual errors in the summary that we have got, I think I would like to hear Mr. Snelson point them out to us before we get into that.

Mr. Chairman: That is fine. I was going to do that. Mr. McGuigan said he had a supplementary but he now says he does not.

Mr. McGuigan: I just make the observation that your scenario about the declining cost of the nuclear plant was really based upon the assumption that we are going to continue having the same inflation rate or higher. Is that true?

Mr. Snelson: I think the assumption is that the real cost of money will be in the four, five, perhaps six per cent range, in that sort of ballpark. What I would expect Mr. Rothman to tell me–and he can confirm that–is that if the rate of inflation were to go down to a much lower level, then we would expect interest rates to come down also, because investors would not

expect such a large return on their money to compensate them for inflation.

1150

Mr. Chairman: Before we go on, Mr. Rothman, do you have a comment?

Mr. Rothman: Just briefly. I would expect that if inflation came down significantly, it would increase the real cost of whatever borrowing we had already done. Over a short period of time, it would increase real interest rates, but as borrowers and lenders adjust it to lower expectations of inflation, I would expect real interest rates to come down below the four per cent that we had been forecasting as the long-term average.

Mr. Chairman: Mr. Snelson, you did mention something about an issue paper. Is it this one, number 4, that I have in my hand?

Mr. Snelson: That is correct.

Mr. Chairman: Would you, for the benefit of the committee, point out to us where you feel there are inaccuracies?

Mr. Snelson: I do not think, in a reasonable amount of time, I could discuss all the errors and misunderstandings that are in this paper. I would bring three to your attention, just as illustrative examples.

On page 2, it says the last time that we prepared incremental power and energy tables was 1986. There is an issue of September 1987, which I have with me here.

There is a major claim made–I think it must be on page 3; I do not see a page number on mine–that we have effectively missed out the capital costs of nuclear plant that have been made to lower our energy costs. If you followed the logic of this paper, we would end up paying for our energy twice. We would pay for it through using coal, assuming that we have used coal in existing plant, and we would pay for it a second time, by assuming that we had built and paid the capital costs of nuclear plant to avoid burning coal; and you cannot pay for it twice.

Mr. Chairman: Was this on page 3, again, the whole page?

Mr. Snelson: That is the whole thesis of page 3.

If you go to the example of costs that is given towards the end–I think it is probably the last page of issue paper 4–it characterizes the 3.6 cents a kilowatt-hour avoided cost, and the note at the bottom says: "It is important to recognize that this illustration only examines the running cost to Ontario Hydro's present system."

The running cost of our present system is of the order of two cents or 2.5 cents a kilowatt-hour. The 3.6 cents a kilowatt-hour includes additional value that is being assigned to having independent generation there over a long term, and its value to avoid new capacity.

Those are just a few examples. There are others.

Mr. Chairman: Mr. Runciman, did you have a question on this?

Mr. Runciman: Not specifically on that issue paper.

Mr. Chairman: All right. Mr. South had a question and perhaps I could come back to you then.

Mr. South: You indicate the costs; the avoided costs you want to go with are the ones over the lifetime of the plant. We had private generator representatives in here who indicated, I believe, that they would recover their costs over five years. Could you give us a curve of your costs?

As you say, if you just look at the first year of the plant, the avoided cost is quite high, whereas if you average it out over the lifetime of the plant, then you get a considerably lower figure. I think that would be useful because then the private generator could also supply energy to you, after those five years at a reduced buyback rate. So it would make it easier to compare the two. As I say, it would be useful if you could give us a curve of your avoided costs from the first year of building the plant to the lifetime of the plant.

Mr. Snelson: That is available. I have in front of me a set of figures put into today's values. This is looking at a future figure, taking out the effects of inflation so that we are thinking in today's dollars. This is not discounting; this is just taking out the effects of inflation. Darlington in the 1990s ranges from six cents a kilowatt-hour to 3.4 cents a kilowatt-hour.

Mr. South: Okay. So from year 1 to–

Mr. Snelson: Year 10.

Mr. South: I think 40 years.

Mr. Snelson: That is from 1990 to the year 2000, so that is representative of the first 10 years of its 40-year life.

Mr. South: That would range from what?

Mr. Snelson: From six cents a kilowatt-hour to 3.4 cents a kilowatt-hour over 10 years. In the next period–I have it only to 2008–but from the year 2000 at 3.4 cents a kilowatt-hour, it drops to 2.3 cents a kilowatt-hour by the year 2008.

I think that is supported if you go back and look at our historic costs. These are projections and everybody can say, "Well, projections have assumptions in them and the assumptions may be wrong," but you can also go back over our historic costs.

If you look at, say, Bruce, then the average cost of energy from Bruce has been in the order of, I believe, two cents a kilowatt-hour. Let's see if I have it here. Yes. The cost of energy from Bruce on the same sort of assumptions is around two cents a kilowatt-hour, and that is only 10 years old. You are talking about a plant that has had one quarter of its life.

If you look back, the figures are representative of average costs of our existing plant. They are also representative average costs of our future plant.

Mr. South: I would like to be corrected on this myself, but my impression of what the private developers told us was that they would write off the costs of their plant in five years. As I say, I am sure then at year 6 they could accept a considerably reduced buyback rate from you.

Mr. Snelson: I think we have tried to accommodate that. I mentioned yesterday the arrangement we had with a private generator in northwestern Ontario where we make available to him a large loan at a low interest rate that helps to cover part of his capital cost. That enables him to see a high rate of return on his part of the investment in the early years, so that he will be encouraged to do that. It also ensures that over the long run, the electricity customer is paying about the right avoided cost.

That is the sort of arrangement that can be made to accommodate both the private generator's desire for a high rate of return and our desire to have an economical electricity supply for our customers.

Mr. Runciman: I just wanted to talk a bit about the discount rate. I am sure Mr. Snelson, since he has read issue paper 4, also read the submission by William Marcus in respect to the comments. You may not be able to remember and you may be at a bit of a disadvantage, but he talked about the discount rate and one of the conclusions–it is not his conclusion–was that "the value of a government guarantee is not costless...." We are talking about the loan guarantee as assumed by Ontario Hydro. "Estimates as high as 1.53 per cent have been made for Canadian utilities. An estimate of the value of the guarantee of about 1.2 per cent can be derived by comparing Hydro's capital structure to that of a typical US municipal utility operating without government guarantee...."

Apparently, the Ontario Energy Board proposed an interim value of 0.5 per cent as well. I am wondering how you respond to that. Have you responded to the OEB recommendation?

1200

Mr. Palmer: The answer to that last question is that we have not. Our board of directors meets in about a week and a half's time to consider the position on both the rate and the OEB recommendation.

Mr. Runciman: That was a 1987 recommendation, not 1988.

Mr. Palmer: That would be 1987.

Mr. McConnell: Yes. There was a 1987 recommendation in which we did respond in collaboration with the government that that was negative. That recommendation was repeated in 1988. As Mr. Palmer has indicated, our board has not yet responded to that.

Mr. Runciman: It seems to me to be a critical factor in terms of getting alternative sources of energy on stream. Can you very briefly summarize why you rejected the OEB recommendation in 1987, which I gather you are suggesting? I have not seen 1988. Is it repeated in 1988, virtually the same recommendation?

Mr. McConnell: There is no real cost to Ontario for the factor that was identified by the OEB. We reflect the costs as they are actually incurred. We pay real interest rates on our bonds and we charge our customers for those actual costs.

Mr. Runciman: I think we all understand that, but you are not placing a value on the government guarantee. That has been part and parcel of this argument. I assume it is part and parcel of the OEB's case as well.

Mr. McConnell: We are simply saying that there is no cost that Ontario experiences.

Mr. Runciman: That is when we get into the debate as to whether or not there is a cost. Marcus certainly clearly enunciates that in the view of many economists there is indeed a cost.

Mr. Rothman: I think Mr. Marcus is saying that there is a value. We do not dispute that, but we do dispute that there is a cost. It certainly is of value to Hydro that we can borrow at lower rates with the guarantee than without. That is why we use it, but–

Mr. Runciman: Marcus also does make the accusation, if you will, that there is a cost and that the people of Ontario will pay more for

Hydro's capital investments. I put it to you that maybe the taxpayer is paying higher interest rates for funding government debt or small businesses whose interest rates are raised or who cannot obtain capital at any price.

At a minimum, ratepayers will be forced to pay for investment decisions made supposedly on their behalf by Hydro, decisions that the ratepayers themselves will have seen as poor economic choices and would never have made after considering their own higher interest rates.

Mr. McConnell: I think that is fair enough. Basically, though, are you not really returning us to the social question of question number one that we talked about at great length yesterday?

Mr. Runciman: I do not know if we are. Again, I think there has to be some–Hydro operates on the assumption that there is no cost. What you are passing on in terms of the discount rate is your real costs and the real cost to Ontario. Marcus and others are not only saying that there is a value to that, but that you are not recognizing perhaps that there is also a real cost.

Mr. McConnell: But is that different from the question that we were asked yesterday?

Mr. Runciman: I happen to think it is.

I just wonder how you would respond. We had an economist before us a few days ago who talked about dispensing with the loan guarantee. I gather Hydro-Québec has gone that route. How would you feel about that sort of an action or recommendation from this committee?

Mr. Snelson: Can I just add a point here that when you are talking about the cost to the province, the evidence of the Ministry of Treasury and Economics before the select committee on Darlington was very clearly that the provincial guarantee does not affect the province's credit rating and that the provincial guarantee does not restrict the government's financial options, either restricting the amount they can borrow or increasing the cost of what they can borrow.

Mr. Runciman: It does not currently, but it has the potential to do that. I think that Treasury and Economics in its comment on the report make reference to that. In fact, they are critical of your lack of consideration about the impact of debt.

Mr. Rothman: I think we are back to the question of what the discount rate should be. On page 19 of Mr. Marcus's written evidence, he refers to that entire question and not simply to the question of the cost of the guarantee. I think if you read page 17, in which he does talk about that, he talks about its value to Ontario Hydro and not its cost to the taxpayer.

You have raised what are two related issues. First, is there a cost of the debt guarantee? I think our answer and that of the Ministry of Treasury and Economics is certainly, "Currently, no."

The second question is, should Ontario Hydro be using as a discount rate for internal decision-making a market-oriented rate of interest or a social discount rate based on some expectations about the cost of capital? The answer is partly that it is a matter of public policy choice, but it is also that we believe the estimates that are made of those social discount rates, those social costs of capital, are high relative to the true cost, especially because, as Mr. Marcus does, they talk very much about crowding out, about the effect that Ontario Hydro borrowing raises interest rates to other borrowers. The evidence is, as Professor Berkowitz suggested to you two days ago, that the effect is not important. It does not exist.

Mr. Runciman: That was one of the most confusing presentations we heard, to be quite honest with you. In fact, the other economists say quite the contrary.

Wrapping this up, Mr. McConnell did not really respond. I was hoping for a response in respect of your views on doing away with the loan guarantee and taking the Quebec option. Also, Marcus mentions doing some sort of a sensitivity analysis on crowding out and ratepayer interest rate, and I am wondering if anything has been done in that respect.

Mr. McConnell: I do not know, if we did away with the loan guarantee, whether Ontario Hydro's rates for bonds would increase or not, but I guess as a person who lives in Ontario, I would rather see us avoid the cost.

Mr. Runciman: Yes. I am not surprised by that. I wonder if you would like to comment on the question of doing a sensitivity analysis on the crowding out and ratepayer interest rate.

Mr. Rothman: I think Mr. Snelson has talked already about doing sensitivity analyses based on interest rates.

Mr. Snelson: Yes. I did discuss that yesterday. In actual fact, this is an opportunity to correct the record. In terms of ranking of options, I indicated the sensitivity to a two per cent increase of discount rate was a 15 per cent to 20 per cent increase in costs among options. I had the range too narrow. The increase in costs of coal-fired options is in the order of 11 per cent or 12 per cent; the increase in the cost of nuclear

options is in the order of 27 per cent; and the increase in the cost of hydraulic options is in the order of 30 per cent to 40 per cent.

In terms of changes in ranking, I was correct that as far as nuclear and coal are concerned, it does not change the ranking. It does change the ranking with respect to some of the hydraulic options. With a higher discount rate, a large proportion of the hydraulic options that we are looking at would be uneconomic, even compared to coal.

Mr. Runciman: Maybe I am missing something here, but how does that deal with the question of crowding out and the ratepayer interest rate?

Mr. Snelson: I think this is a question of effect. If, because of concerns that we were not applying a sufficient value to capital, for whatever reasons, whether it is crowding out, social discount rate or other such factors, we were to be instructed to use a higher cost of capital than our actual cost of borrowing in our evaluations, then this is the sort of effect that it would have on our evaluations.

Mr. Runciman: I appreciate that, but you have not done a specific study on what is happening with respect to using your current method and what impact it is having in terms of crowding out.

1210

Mr. Snelson: I do studies on how that affects what we would plan for in the power system and Mr. Rothman's division would have opinions and studies on how that effects the economy in total.

Mr. Runciman: So I was asking the right guy in the first place.

Mr. Rothman: Our current estimate of the social discount rate for Ontario appropriate for public capital expenditures in Ontario is about five per cent to six per cent.

Mr. Runciman: That is still not what I am asking. I am asking if you have done any sensitivity analysis on the crowding out and ratepayer interest rate based on your current discount rate.

Mr. McConnell: Are you talking about whether we bump out other, more desirable economic activities in our society?

Mr. Runciman: Right.

Mr. McConnell: Yes. That was an issue we did address yesterday, but we could repeat it.

Mr. Runciman: Perhaps it is in Hansard. I must not have been present when that discussion took place.

Mr. Rothman: Perhaps Mr. McConnell is more sure than I am of the question you are asking. The question was whether we have done any sensitivity analysis on crowding out. I am not sure what question you are asking. Are you asking what the discount rate might be under various assumptions of the degree of crowding out?

Mr. Runciman: Using your current methodology. That is what I am talking about, about the impact it is having, really refuting, for example, the charges that were made by the Quebec economist on the impact you are having on the market.

Mr. Rothman: Essentially, you are asking a question about what the social discount rate would be under various assumptions of crowding out. Our calculation of the social discount rate under our best assumptions about crowding out is five per cent to six per cent. Others have made other calculations. Glen Jenkins, for example, has calculated a social discount rate with his assumptions about crowding out of about eight per cent to 10 per cent. I think it is David Burgess of the University of Western Ontario who has calculated a social discount rate with his assumptions of crowding out for Canada of around seven per cent, 6.9 per cent.

That is a range of what you get. We have not done a calculation of our own of the social discount rate, using anything other than our best assumptions about crowding out.

Mr. Chairman: Mr. Runciman, perhaps we could move on. We have a number of other questioners.

Mrs. Sullivan: I am going to try to move back to avoided cost. One of the opinions which was expressed to me just recently was that if the interpretation of the arithmetical equivalent in class 34 of the Income Tax Act were changed, the whole avoided cost question would no longer be meaningful. Do you concur with that?

Mr. Snelson: I am going to pass that to Mr. Palmer. The avoided cost is the cost we avoid and that is independent of the depreciation treatment in the Income Tax Act because that does not apply to us.

Mrs. Sullivan: For the cogenerators then.

Mr. Snelgrove: For the cogenerator, it certainly does apply. I think the effect is more in terms of given a level of avoided cost and rates set at avoided cost, how much independent power will be developed? That is something perhaps Mr. Palmer could respond to.

Mr. Palmer: Class 34 gives certain developers of small hydro, cogeneration and so on a quick write-off of depreciation. That is very attractive for entrepreneurs who want to come in and put some money in the project. If they are after writing off the cost quickly, that is a very strong incentive for them. If the federal government decided to do away with that provision in the Income Tax Act, then I suspect the source of funds for parallel generation would likely be harder to come by, because there is some class of investor really looking for a fast-in, fast-out type of operation.

Mrs. Sullivan: I think the argument was that if the breakout rate were changed and the level raised, because of the increased write-off the avoided cost argument would become almost negligible, because the whole cost of the cogenerator would change; the whole cost structure would be altered. We can skip that one and come back to it.

The other question I wanted to pursue related to the flexibility in Ontario Hydro's negotiating on specific cogenerating projects. I am wondering if the avoided cost argument Hydro uses does not limit the opportunity for determining a premium for something that is a positive addition to the system. When I say to the system, maybe it is to the economy as a whole, but it may also be to Hydro.

The changing technologies in the pulp and paper industry, for example, which are improving productivity and, therefore, competitiveness, are creating additional electrical demands, particularly in northwestern Ontario where our transmission is difficult. I am wondering if it would not be valuable to consider a portion of the payment as a premium, because that is a valuable change not only for the Ontario economy, but also there is a substantial benefit to Hydro in terms of the negotiation of cogenerating facilities or expansion of–what is it called?–electrothermal pulping.

Mr. Palmer: We have quite a unique problem in northwestern Ontario, as you know. There is a very substantial amount of quite economic cogeneration available there. The problem is that if it were developed at this time, we could not move it anyplace out of the area. We cannot move it to southern Ontario and we cannot absorb it in northern Ontario. If the pulp and paper industry moves strongly towards thermomechanical pulping, that will open up the opportunity for more development of cogeneration in the north.

Mrs. Sullivan: Is that not already happening?

Mr. Palmer: It is happening, but at the moment it is my belief there is none on our system, and it is unlikely that the first will perhaps be two or three years hence, but it will come. I am convinced of that.

Mrs. Sullivan: I know five or six industries that are certainly pursuing this, not only in the planning but also in the implementation stages.

Mr. Palmer: I think you are right. I hope I did not leave the impression that it is not going to come. There is none now and for some way along. I am saying to you that when it does come and the speed at which it does come, that potential cogeneration and development in northern Ontario will be very important.

We now know, generally speaking, the economics will be necessary to make it happen. I am quite comfortable that over time, with the necessary loads developing, a good portion of it will be developed and this corporation will be making sure it does. We know very well what the economics are of the pulp and paper industry companies. We know very well what the economics are of Dow Chemical, for instance, in developing their stuff. I can tell you they are a long way away from the figures you heard yesterday.

Mrs. Sullivan: Would you like to expand on that?

Mr. Palmer: Let's talk about gas prices for a moment. If a company developed a reasonably good combined-cycle plant with perhaps a little cogeneration thrown in, it should be able to get a heat rate of around 8,000 BTUs per hour, and the cost to generate will work out, at current gas prices, at about two cents a kilowatt-hour. In addition to that, there is some maintenance and that kind of thing. It would be reasonable to add half a cent or six tenths of a cent to that number. Their out-of-pocket cost of generation is likely to be in the order of 2.5 to 2.7 cents.

1220

Yesterday, for instance, the company said it would cost it $27 million to develop some 87 megawatts. If you do the arithmetic, the capital will work out to about $300 a kilowatt. If this installation runs at an 80 per cent capacity factor, which is a reasonable figure–I think Dow's experience with its own plants is a capacity factor better than that–they will very quickly find out they will get their money back in about four to 4.5 years from the installation.

If you look back at the material they supplied on September 14, I think–I am not sure whether

you had a presentation–they said $20 million of the investment they might make they would make for internal purposes and perhaps an incremental $7 million would be required to supply power to Ontario Hydro. If you look at the $7 million, that would get their money back in roughly 12 months, based on our current assessment of what it costs.

We have done detailed joint studies with the pulp and paper industry to determine what the costs are to develop cogeneration. Those studies were done by consultants who are familiar with the pulp and paper industry, selected by the pulp and paper industry, which we either partially or fully funded. We have a very accurate picture of what goes on.

As Mr. McGuigan said to me, and also the presidents of all companies say, their business is to make cheap and sell dear. You have to keep that in mind when you are talking with these monster smeltering multinationals.

Mrs. Sullivan: One of the things that has become clear is that in the independent generation scenarios the cogenerators are going to be the bulk of that market, that target or whatever.

Mr. McConnell: We expect the major part would be cogeneration and of that cogeneration, we expect the major part would probably be gas-fired.

Mrs. Sullivan: As a consequence of that, we have also heard before the committee that there is considerable tension and disagreement about whether it is viable at rates that Hydro is paying for cogeneration plants to be cost-effective. We have heard the Dow argument, which is the capital argument, but we have also heard other arguments in terms of flexibility in contractual relationships over a period of time, based on the accelerating price of gas, consistency of supply and so on. I have a sense that whether we accept Hydro's position or the cogenerators' position or whether we come to some sort of middle position, this argument is still going to go on.

What I am wondering about is how flexible Hydro can be in terms of looking at these contracts and opportunities.

Mr. Palmer: A ceiling or cap for all kinds of negotiations is cost. What it costs us is the ceiling we are using, but within that framework, we are quite indifferent as to how we structure a deal, whether we provide a loan or a fixed price for 10 years or whatever is within that framework, whatever the best deal turns out to be for the supplier. We really have no barriers as to how the proposition is constructed.

With respect to gas contracts, I think something one of the gentlemen from Dow said yesterday is correct. Some months back, this year, it was comparatively easy for cogenerators in Ontario to get a 20-year contract with some sort of an escalation factor. Today, it has become terribly difficult. The folks in the west are frequently saying, "We want openers." We have a couple of cases now where they are really not prepared to extend beyond 12 years. They are really anticipating there will be a big sale opportunity in the United States cogeneration and it might be more profitable to sell there.

Internally, we are pretty sceptical about that. We think cogeneration in the United States is beginning to hit some environmental difficulties that delay the plants from coming into service. When the gas supplier gets tied into a 15-year deal, he hopes he will start selling two years from now and he will end up beginning to sell four years from now. That changes his economics very substantially.

I think it is a temporary situation; that is what I am saying. Right now, western gas suppliers are playing kind of hard to get, and that is going to disappear in the next year or so in our judgement.

Mrs. Sullivan: Is there ever any situation where it would be useful to pay above the ceiling?

Mr. Palmer: I cannot think of any offhand, but I do not think the ceiling is general throughout Ontario. We are keenly interested in the Dow proposition, although we heard more about it yesterday than we have been able to get from the company over this past year or so. It happens to be one location in the province where we could use it now. We had some transmission difficulty and when that happens, the marginal cost that we could provide or the avoided cost, I think, would be higher than the average cost when we get down to looking very carefully and very specifically at it. We just have not had the opportunity to do that at this stage.

Mr. Snelson: I would just add one point. We have a generally published avoided cost calculation which applies across the system, but the way we deal with large potential cogenerators is that we try to have a more accurate look at the avoided cost of that particular installation. Some of those will have an avoided cost higher than the generally avoided cost and some may have lower avoided costs.

Mrs. Sullivan: I understand that.

Mr. Snelson: We can identify specific situations where there is a higher avoided cost and we

can, therefore, afford to pay above what would be our generally avoided cost in that situation.

Mr. Charlton: I think your note said you wanted to get out of here by 12:30.

Mr. Chairman: Yes, but we may make it 12:30 in Manitoba, if that is all right.

Mr. Charlton: I am prepared to continue now or after lunch.

Mr. Chairman: I wanted to finish this subject. We have others to cover after lunch.

Mr. Charlton: There are more questioners than just myself. It is an important topic, and I do not think we should be rushing to try to finish it.

Mr. Chairman: We have two more important topics as well.

Mr. Charlton: I understand that, but there is no point in our leaving unresolved important areas of this debate. All I am saying is that I think members are going to keep going at this one until they are satisfied.

Mr. Chairman: Are you suggesting we break now and continue after?

Mr. Charlton: Precisely.

Mr. Chairman: All right. Before we do that, though, I wonder if Mr. Argue would like to comment on issue paper 4.

Mr. Argue: I think I would like to leave that to some questions of Mr. Snelson. I think we can clear up what misunderstandings Mr. Snelson appears to believe we have in the preparation of this report. I just might add that it is the view held by several of the consultants who have looked at this issue, and I find it interesting that in my time, and I think this will be seen as we go through some of the questions, that this is the first time Ontario Hydro, other than in the preparation of the paper, has taken the opportunity to comment on what a number of people who have taken a look at its methodology from experience in several jurisdictions have had to say about its methodology. They see that as a positive step, that at least Ontario Hydro is beginning to recognize that this is an issue worthy of discussion.

Mr. Chairman: Before we adjourn, could we agree on, say, half an hour more on this after the break? Nuclear costs and transmission costs are equally important subject we would like to cover, plus there are some closing comments from Hydro. All of that has to get done in three hours this afternoon, if we can agree.

Mr. Charlton: In terms of the importance of the topics, I agree, Mr. Chairman. In terms of the length of time we are required to deal with them, transmission costs, for example, will take far less time. That is not to diminish their importance.

Mr. Chairman: If we leave about half an hour for this subject, we will have half an hour for the other two together, if that is acceptable.

Mr. Charlton: I have no problem with that.

The committee recessed at 12:31 p.m.

AFTERNOON SITTING

The committee resumed at 2:09 p.m. in room 228.

ONTARIO HYDRO
(continued)

Mr. Chairman: Can I call the afternoon session to order, please. I think before we broke, we agreed to spend about half an hour on the demand management or the independent generation issue. We will start off with Mr. Charlton.

Mr. Charlton: I would like to start out on the avoided-cost question. I would like to try to take a little bit simpler approach to the question than what we went through this morning so that all of us can better understand what it is we are really talking about, especially in the context of some of the questions we raised two years ago and thought we had answers to that do not seem to be the same answers we are getting now.

Demand/supply planning strategy essentially says to us that, if the crude screening you have done to date bears out, Hydro's option of choice for new supply is going to be a nuclear plant. Let's assume for a minute that in 1990 you get approval to go ahead with the construction of Darlington B to come on stream about 2003 or 2004. What are your estimates of the average costs of the power out of that nuclear plant?

Mr. Snelson: First of all, to come back to the assumption, I do not think it is feasible that we could have approval to construct Darlington B in 1990. I think we may make a decision in 1989 or 1990 to seek approval for some additional nuclear generating plant, but the decision to construct would not be made until after the approval process, and it could be another several years down the path.

Mr. Charlton: No, I am just talking about the approval to proceed with the whole project. I was not talking about environmental assessment and all the rest of it.

Mr. Snelson: Okay. But coming back to that, I think that in today's dollars, in today's values, the cost of that plant would not be substantially different from the costs of Darlington.

Mr. Charlton: Okay. I think we have already been told that. What I want to know is, what is your estimate of what the average costs of power out of that plant will be in 1994 dollars; or, put another way, what will its rate impact be on the average rate in 1994?

Mr. Snelson: The plant is coming in service in the year 2000 and something, as I recall.

Mr. Charlton: Well, probably the first reactor in 2000, the second in–

Mr. Snelson: Okay, but the rate impact prior to the in-service date of the unit will be very small because, substantially, the costs during the construction process are capitalized and are recovered over the operating life. The effect on rates of building a new nuclear plant, compared to some other option, if it is a long-term economic option, if the nuclear plant is economic over the long term, will be to lower rates, on average, over the life of the plant. That may have a pattern in it which has higher rates for a few years and–

Mr. Charlton: Yes. I did not want to know what the startup rate would be. I asked what the average rate would be.

Mr. McConnell: Basically, we have this nuclear cost review coming up, Mr. Charlton. In December 1987 I issued a request to the corporation to update all of our cost data for the analysis that we expect to do with regard to planning in the spring of 1989. That process of updating those data is under way and it has not yet been completed. Because we are talking here about avoided cost–that is the question that you are asking–I think it is fair to say that the kind of costs we are talking about are still in the vicinity described by Mr. Snelson. If we talk about a levelized cost, that is, the effective cost to such a commitment, everything expressed in terms of 1988 dollars for a plant going on stream about the end of the century would be, as a reference, in the vicinity of three cents.

Mr. Charlton: All right. That still does not get at what the actual cost would be.

Mr. McConnell: That would not cause an increase in the rates of Ontario Hydro.

Mr. Charlton: In real terms?

Mr. McConnell: In real terms.

Mr. Charlton: What I am talking about is in actual terms, in dollar terms, in terms of what the consumer pays and what an independent generator may be able to generate for at that point in history.

Mr. McConnell: Well, by definition, what we would be offering to a nonutility generator would also be based on avoided cost.

Mr. Charlton: At that point.

Mr. McConnell: Of course, the contracts Mr. Palmer has been letting all have cost escalator provisions in them, so they track the costs.

Mr. Charlton: Let me put the question to you another way. If an independent generator comes to Hydro with a proposal in 1988, that proposal is going to take five years to put in place. He sits down and starts into discussions with Ontario Hydro about the buyback rate so he can figure out his economics. What do you tell him will be the buyback rate? Do you give him the present avoided cost you have given this committee?

Mr. McConnell: No.

Mr. Charlton: What do you give him for five years from now?

Mr. Palmer: The calculated avoided cost for the year.

Mr. Charlton: Can you provide us with some of those figures so that this committee does not get misled by dollar figures that are in 1985 dollars? When we look at questions like what independent generators can come on stream at, it is important for us to know what it is they are really going to be talking about when they talk to Hydro.

Mr. McConnell: We can do that, but I would have thought it would have been more meaningful to give you a 1988 dollar plus escalation than to give you a 1995 dollar with escalation, because in order for it to be meaningful, you have to ask, "What escalators did you use?" and you have to bring it back into today's–

Mr. Charlton: You can give us both, but I just want to know what the buyback number is going to be for the independent generator who says: "I have a project here that I can put on stream in five years. What'll you pay me for 10 megawatts of firm power in five years?"

Mr. Palmer: If we take the year 1995, I think the number is likely to be in the order of around six cents.

Mr. McConnell: In 1995 dollars.

Mr. Charlton: Okay. But that is the impact on rates.

Mr. McConnell: I am not too sure it would be that high, would it? The escalation would be that high?

Mr. Palmer: It could be lower. We do have those numbers.

Mr. Charlton: You recall that two years ago under questioning in this committee or its predecessor, the chairman of Hydro sat there and said that by 1995 it would be 10 cents.

Mr. Palmer: I think that might be right. But you recall what your gas witnesses said, that it was a very sharp drop in the price of gas and oil in the future. Mr. Rothman showed that prices were roughly half what they were even some three years ago, the escalation. That has a profound effect on the long-run avoided cost.

Mr. Charlton: Okay. We have had the discussions before and Hydro has said before that it is not going to be prepared to pay the avoided-cost rate in 1988 that reflects the year dollars in 1994 if it does not need the power now. That is Hydro's position and we understand that. But what this committee also has to understand in real terms is what the real avoided cost of major long lead-time new supply is going to cause in terms of an impact on the system if we want to be able to assess what realistically we can avoid at perhaps lower prices in the meantime with other supply and demand options.

1420

Mr. McConnell: Well, it is in the order of magnitude of three and one half cents plus escalation. So if you take the accumulated escalation from today to 1995 and add it to the three and one half cents, it is in that order of magnitude. I do not know whether the number six is right or whether it is five. We do not carry around numbers corresponding to all years, as you might appreciate, but we can certainly get that number for you.

Mr. Charlton: Presumably, your people who are negotiating with independents out there have a table of indicators and–

Mr. McConnell: Yes.

Mr. Palmer: Yes, we have.

Mr. McConnell: There is a detailed schedule of rates and everything else in the agreement.

Mr. Charlton: Well, it would certainly help us, in looking at that kind of stuff, if we could have that material.

Mr. McConnell: Yes.

Mr. Charlton: I have a second question and I will try to be as brief as I can, Mr. Chairman. A couple of weeks back, we had a company in here, Nirabro Industries, Tim Richardson, who, for this committee, went through a very thorough briefing on the new technology–not really new technology, but a combination of old technologies in a new way. There were a number of your officials who were here for that presentation, who were reasonably impressed with the potential, including, I think, yourself, Mr. McConnell, in terms of having watched you during that

presentation and the expressions on your face and so on.

Mr. McConnell: I listened carefully.

Mr. Charlton: I know you did.

Mrs. Grier: If we have learned to read your face in all these many weeks.

Mr. Charlton: That is right. Now, he described for us how they went into the Ragged Chute site and did the work that they did on the hydraulic air pump.

Mr. McConnell: In combination with gas.

Mr. Charlton: Well, you recall at the end of his presentation he said that there had been no gas turbine installed at Ragged Chute.

Mr. McConnell: No, he was talking about the concept.

Mr. Charlton: The concept, that is right. There was no full test of the technology. In my understanding, you have basically a new technology, which a number of your people seem to be reasonably impressed by the potential of, even if it still has some proving to do. How do you approach that kind of a situation? What do you do when something looks particularly promising in terms of seeing that it is fully assessed for its potential?

Mr. McConnell: We are trying to stay abreast of all emerging technologies, and where an emerging technology appears to have merit and is attractive, then of course we will intensify our inquiries and studies into that to find out more about it, and if it were very promising, we would want to exploit it.

That particular one has limitations in terms of amount because that is a combination of finding the hydraulic sites to do that with, in conjunction with marrying it with the gas.

Mr. Charlton: My understanding in the particular case of Ragged Chute is that the primary reason why the gas turbine was never installed there was because Ontario Hydro said no. Can you tell us what happened there, why we never got to a full demonstration?

Mr. Snelson: I do not know whether Hydro has said no to the gas turbines. The one aspect of that site that we have been quite careful about is that the site has the potential to be developed as quite a large, pure hydroelectric site.

Mr. Charlton: Conventional.

Mr. Snelson: Conventional.

Mr. Charlton: Yes, I understand that.

Mr. Snelson: We have been protecting the ability to develop that site in the long term as a hydraulic site, and that has put some limitations on the length of time the private developer can be on that site with a very small development that is less than its full potential. I am not familiar with the details beyond that. That is about as far as my knowledge of that specific situation goes.

Mr. Charlton: It would certainly be helpful again if you could look into that and provide us with some information, because my understanding is–and I do not have the technical expertise to assess it fully–that the proposal these gentlemen originally went to Hydro with, in terms of their alternative proposal for Ragged Chute, was for more megawatts than the conventional site would provide.

Mr. McConnell: I do not know that I could add anything more than what Mr. Snelson said, that we did not want to forgo the possibility of having significant hydraulic generation at that site for the long term, to give it up in the long term for a relatively small installation in the short term. That is the impediment that Mr. Snelson has referred to. But, on the other hand, was that not the site where we had the compressed air as well?

Mr. Snelson: Yes, that is the one.

Mr. McConnell: Yes, we had compressing air at that particular site and were making it available to the community with hydraulic process. Then, a few years ago, we had a fire up there that took that installation out of service at that particular time.

Mr. Charlton: It is now serviceable?

Mr. McConnell: Yes. It was an important service for that particular community. It turned out that we were having trouble breaking even in terms of operating that compressed air.

Mr. Charlton: I am not in a position to assess technically what I have been told. I am not even sure of the exact numbers, but my recollection of my discussions was that, conventionally, the Ragged Chute site has a potential of about eight megawatts.

Mr. Penn: Maybe I can help a little bit, Mr. Charlton. I testified in early August that Ragged Chute, if it is developed properly, has a capacity of over 100 megawatts–104 megawatts, to be precise.

Mr. Charlton: The lease you have granted is not for that, though.

Mr. Penn: That is our assessment of the future potential if that site is fully developed, rather than being developed on a spot basis.

Mr. Charlton: You have granted a lease, though, to another developer for a five-megawatt development.

Mr. Penn: That is certainly an alternative. What I was commenting on was that if the full development of Ragged Chute were to occur, there is a capacity of 104 megawatts and an energy equivalent of in the mid-20-megawatt range.

Mr. Charlton: There may be. All I am suggesting is that you have granted one lease to one person to do much less than what you are saying the whole potential is. My understanding is that Mr. Richardson went to Hydro with a proposal originally for 17 megawatts.

Mr. Penn: I was only going to comment that from a design point of view, my organization has not received any detail for us to be able to compare, on behalf of the province, the advantage of one to the other. As Mr. McConnell says, we produced compressed air from that particular facility for very many years in the mining processes that occur locally. It is not a new technology that is being proposed.

Mr. Charlton: I understand. I just think it would be useful if you looked into why the compressor was never installed and whether in fact we can get a full demonstration of this technology fairly quickly in the near future, because we have the hydraulic pump there and it is now working again. I think it would be useful if we all had the demonstration project in full, so that we can get some kind of real assessment of the real potential of the technology.

Mr. McGuigan: I did not challenge Dow Chemical yesterday, because I really did not have a full explanation in my mind of the average costs over the life of a generating station. But when you look at their figures, they want a 20 per cent return on their money and they said it will pay back in 10 years, which means that the machine will pay for itself several times, as compared to Hydro putting in concrete and machinery. It pays for it only once. It does not have that intergenerational requirement to pay back, as does a farm or a business or whatever it is. One generation has it and sells it to another generation; it has to pay for itself again. If it has a long life, if it lasts 100 years, it pays for itself four or five different times. You pay for it only once, ever.

1430

When I look at that, I have to tend to agree that there is not going to be much cogeneration from industry if Dow Chemical is any example of what is required in the way of a payback. They just do not have any chance of competing with you on the basis of hydro at cost. I am not saying this as a criticism. I am just putting this out as a comparison of the two situations. As long as Hydro is on hydro at cost and you do not have intergenerational changeover, as you do on stocks or physical facilities, they can never compete with you.

Mr. McConnell: This morning Mr. Palmer quoted you some numbers. We believe that if an industry or commerce needs steam for its own chemical or heating or pulp-and-paper process, whatever it needs, it can make a profit that is good enough to meet the requirements of a private company and still our customers can save too, as long as it can do that at less than our avoided cost. It is a win-win situation.

But we do recognize that, with the lower costs that exist in Canada and in Ontario Hydro, these avoided costs will be lower than those which exist in the United States. Certainly our customers should not be subsidizing these large multinational corporations. We agree with you on that point.

Mr. McGuigan: Their testimony made me question their motives, although I know we are not supposed to question their motives. But my memory is long enough and I have lived close enough to the Great Lakes that I remember when this same company had a public relations officer saying it was not putting mercury into the lake when, in fact, it was. So I have some bit of scepticism in listening to its testimony.

It seems to me they are going to win either way. One, they want cheap power for their worldwide operations to compete with other countries, notably the United States but countries all over the world. The cheaper the power they have, the better it is for them. If they can keep other companies and themselves out of cogeneration and force us into greater development in hydro, they are going to be the winners because they get cheap power. At the same time, if they can con us into paying 6.5 mills, they are also going to be the winners. I hope these people are not representative of industry in its approach to cogeneration. I just wonder what your comments are.

Mr. Palmer: Let me be absolutely fair in respect to Dow. I think they characterized their situation reasonably well. They have had cogeneration for many years. It has worked well for them, and it is my belief that their costs of producing both steam and electricity for their own use were better than if they had produced

steam in the boiler for their operation and bought all their output from Ontario Hydro. So I think there was an economy for them to go to cogeneration.

As I listened to them yesterday–and indeed, sir, it was some of your questions that kind of exposed the situation better for me–the third unit they have, which is not now in operation, which they want to refurbish and sell some of its output to Ontario Hydro, will not be strictly a cogeneration installation. I felt they had in mind a combined-cycle plant, and they kept making the point they did not have enough steam available, enough steam absorption capability for their process. So they were really talking about a combined-cycle plant with perhaps a little cogeneration. The economics are quite a bit different for that installation from what they are for cogeneration.

Mr. McGuigan: They denied that when I questioned them. They said that, in their view, it is different.

Mr. Palmer: If you go back to some of the vague figures I quoted this morning, I talked about 8,000 BTUs per kilowatt-hour, which I think is about typical of a high-quality combined-cycle plant. If they have a good cogeneration installation, that number should drop to perhaps about 6,000, and when that happens, their cost of fuelling drops accordingly. I used a figure of two cents, perhaps 2.2 cents, for the combined cycle. That figure would probably drop to about 1.8 cents for their fuelling cost, so I was prepared to give them the benefit of the doubt that they were doing their economics on the basis of a combined cycle rather than a cogeneration process. But still, it is a private company, an investor company. If they want to do business, they want to do business at a substantial profit, and I think as a utility we have to be sharp about negotiating with them so that we know the ramifications of their proposal too.

Mr. McGuigan: Thank you for clarifying that business about the two operations of the unit. But it does point out that Hydro, because of Hydro's costs, really has quite an advantage in this whole system.

Mr. Palmer: Yes.

Mr. McGuigan: In what we are talking about, it seems to me the decisions we make are more philosophical than they are economic, because economics are on your side.

Mr. McConnell: I think that is right. When we compare our costs with those of the United States, there is this question abut the cost of money, which we have been discussing yesterday and today. But, setting that factor aside, our bottom track record in terms of costs is still better than that of the US if you apply the same return on investment.

We have done a much better job on standardizing our designs, building multi-unit stations, getting economies out of operating and maintenance standardization and procedures, minimizing our investments for spare parts, achieving fast turnarounds and so on. Our bottom line is that we do not think, if somebody is going to burn gas to make electricity, that a private company in Ontario is going to be able to compete with Ontario Hydro on the same terms. They have not done it up to now.

Mr. McGuigan: I think that is evident.

Mr. Chairman: Thank you, Mr. McGuigan. Mrs. Grier?

Mrs. Grier: I am sorry, I am finished.

Mr. Chairman: That was quick.

Mrs. Grier: Whatever question I had before lunch has been lost in the verbiage ever since.

Mrs. Sullivan: I had a question in a different area, and it relates to the bidding process. Bob Franklin in his introductory remarks indicated that Hydro was quite interested in moving into bidding much faster than it had originally anticipated, and some of the testimony during the period since then has indicated that perhaps we need a more mature independent generation sector before the bidding process indeed becomes valid.

The second aspect of bidding related to one of the American consultants who was here–I cannot remember which one–who said that, from time to time, their utility most recently has been asking for bids based on either supply or demand management. I wondered if that would also be part of the Hydro approach to bidding.

Mr. Palmer: Let me respond to that. I think there is some value in the business of going out for bids for demand management. We are watching two or three attempts to do that in the US quite carefully at this moment, because in some real sense, demand management is a competitor to supply, whether the supply comes from the utility or from an independent generator. So we have no real plans to go to bid for demand management at this point, but we are certainly watching with lively interest how this might develop.

Have I responded to your question?

1440

Mrs. Sullivan: To the second part. The first part related to the need for a mature independent generation industry before the bids in fact become a valid measure of opportunity.

Mr. Palmer: We are generally aware that that might be a concern. One of the reasons the prospect looks fairly attractive to us is that we are beginning to get a fairly large volume of proposals at the present time. Some of those proposals are beginning to compete a little, one with the other: one or two for the same site, one or two with the same supply into the system and so on. It is becoming a little more difficult for us to rationalize between the proposals and, up to this date, we have been fairly informal about the business. If anyone approaches us with a proposition, we sit down and see whether there is a prospect for a deal, and we do each one independently.

Several states in the United States have been out for proposals; I think seven or eight have already called for bids and selected independent generation. The surprising thing about that is that they have been states that have been pretty far removed from where there has been a lot of independent generation–places like Maine, Massachusetts, Vermont and so on, where there cannot be a strong infrastructure at this time for it, and they have got a surprising volume of bids, sometimes as many as five times the number they have asked for.

I heard Martha Hesse, the chairman of the Federal Energy Regulatory Commission, say that, in addition to that, prices have generally come in well below the utility's avoided cost. She quoted figures as low as 60 per cent of avoided cost.

Our position at this point is that we should go out there and try it, put out a test case, if you like; call for 100 or 200 megawatts. It will have the value of testing our processes, testing the interest on the part of potential suppliers; it would give us some experience with the process, and then we would look at the results. We have not made a big commitment at this stage to the future of doing it this way. In the meantime, we will carry on with those below five megawatts under standard conditions, and for those cases we have in front of us right now, we will try to work through those on a negotiated basis. That is our general plan.

Mr. Passmore: On a point of clarification, Mr. Palmer: On that process, when you go to this bidding that you described just now, would you indicate the price that bidders were expected to come in at?

Mr. Palmer: Our proposal, when it goes out–and by the way, it will not be too long now: There is to be a workshop here in Toronto sponsored by us, the Ministry of Energy and the independent power producers. We are going to put before the group what we generally propose to do in respect to bidding and give them a chance to respond and make observations about it, not only during the workshop but subsequently for a month or two; so we will get their infeed.

We will generally tell them what our avoided costs will be, so in making their bids, they will know generally what area we are in in terms of the avoided cost. Is that helpful?

Mr. Passmore: It helps, yes. I am not quite sure how it constitutes bidding when they have to know what price they are supposed to come in at, though.

Mr. McConnell: Our strategy, Mr. Passmore, says we will pay up to the avoided cost, but our strategy is also seeking to get the best deal for our customers.

Mr. Passmore: Perhaps "bidding" is the wrong word, just as a point of clarification.

Mr. McConnell: Yes. I think we will probably be calling it an RFP, request for proposal.

Mr. Argue: Mr. Snelson, I think we can agree to disagree on a number of points with regard to avoided cost, but for the help of the committee, I would like to run through what are some of the facts with regard to avoided cost. They are very simple questions, and I would like your response to those very simple questions. Back in 1985, your incremental costing tables identified a need for capacity. What was that year?

Mr. Snelson: I would have to go back and look.

Mr. Argue: Would you accept, subject to check, that you said you would need capacity in 1998?

Mr. Snelson: That sounds about right.

Mr. Argue: In 1986, you issued incremental costing tables. Would you accept, subject to check, that you said you would not need capacity until the year 2001?

Mr. Snelson: That could well be. Can I add that the tables that are being prepared at the moment will identify a need for capacity and give value to capacity starting around 1995?

Mr. Argue: Mr. Snelson, with regard to the present buyback rates, what amount out of the 3.76 cents per kilowatt-hour is assigned to

capacity? On avoided cost, we have talked about Ontario Hydro's costs, not the costs of parallel generators. Just in that 3.76 cents, how much is capacity?

Mr. Snelson: I do not have the breakout in front of me.

Mr. Argue: Would you accept, subject to check, that it is 0.2 cents a kilowatt-hour?

Mr. Snelson: I would say the short-run avoided cost, which is the cost of fuel, at the moment is 2 to 2.5 cents a kilowatt-hour, no higher. The difference between that and 3.7 cents a kilowatt-hour is being paid because of the future benefits of power generation not being experienced today in terms of avoiding scrubber commitments, the scrubber capacity, and avoiding the commitments for new generation.

Mr. Argue: Okay. Getting back to the 1985 and 1986 tables, we had a discussion about that matter back in August.

Mr. Snelson: Can we not discuss the 1987 tables, which are the current ones?

Mr. Argue: I think that to a certain extent here you were trying to suggest to the committee that things are going to change in the future. I believe, from my experience in these areas, a large part should be judged on the experience of Ontario Hydro under the assumption you have maintained since 1985 that you were aggressively promoting parallel generation. I have a question about the 1985 and 1986 tables. There was a drop of 36 per cent in the value of power between those two tables. You speculated that it could have been because of coal drops. Will you again accept, subject to check, that the reason those changes were made resulted from Hydro considering that there would be no savings in transmission capital costs?

Mr. Snelson: No, I would not accept that.

Mr. Argue: Could you provide an explanation between the 1985 and 1986 tables?

Mr. Snelson: I can give you the transmission assumptions on the two tables. Both tables had in them the transmission costs and the incorporation of new generation. Neither table had in it an allowance for bulk power transmission. The 1987 tables, which were issued one year ago and are part of the record, do have allowance in them for bulk power transmission.

Mr. Argue: That completes my questions, Mr. Chairman, but I would like to briefly comment on the three factual errors Mr. Snelson commented on before lunch today. I appeared at the Ontario Energy Board this year talking about buyback rates and requested from Ontario Hydro its most recent issues of incremental costing tables. That is on the record. The most recent incremental costing tables, point one, that were provided to me were from 1986.

Two, on Mr. Snelson's contention that my explanation with regard to the nuclear plant capital costs being treated as energy costs was doublecounting, I put on the record, and I will provide for the committee, that Ontario Hydro has mixed two methods. Depending on whether you take it from Mr. Snelson's perspective, it is the best for the utility. From the industry's perspective, it is the worst perspective of two different models, one the peaker method and one the system planning method.

1450

The contention I raised on that particular page follows that line of logic, if Ontario Hydro had been as innovative with regard to its incremental costing tables as it had been with its planning process in developing standard costs and representative plans.

The last point of the three issues Mr. Snelson mentioned is a very simple analysis to respond to a line that had been given back in August that we had to be very careful about what we paid parallel generators or the impact that would have on rates. The point was simply made in that case, judging on the basis of a value of 3.6 cents, which is the value Ontario Hydro extends to the long-run avoided cost on the system at that time, we would have had only a 2.89 per cent rate impact, with a 66 per cent raise in avoided costs and over 1,000 megawatts of parallel generators.

I hope the committee recognizes that this is a contentious issue. It is an important issue and one on which I have had some discussions with Ontario Hydro officials in the past. It is a question of how we are going to resolve this issue. I suggest to you that with the present process, we are going to have a great deal of difficulty in resolving that issue.

Mr. Chairman: Thank you. Any comment, Mr. Snelson, or should we move on? I do not really want to get into debate.

Mr. Snelson: As regards the fundamental issue of doublecounting, obviously we disagree. There are other fundamental issues that were raised in that paper that we disagree with as well, but we are not going to settle it here. I know that.

Mr. Chairman: Thank you. Are there any further questions or comments on independent generation?

Mr. Passmore: Over the lunch hour, actually, a couple of committee members asked me for clarification of just exactly what the average cost of a new plant over its lifetime is, Mr. Snelson, which I believe is what you said. It is how avoided cost is calculated, the average cost of a new plant over its lifetime.

Mr. Snelson: It is consistent with the average cost of a new plant over its lifetime.

Mr. Passmore: Okay.

Mr. Snelson: It is not the actual mechanics we go through, but it is consistent with it.

Mr. Passmore: Does that assume a lifetime then for a nuclear plant of 40 years?

Mr. Snelson: Yes.

Mr. Passmore: Does it assume a capacity factor of 80 per cent?

Mr. McConnell: It depends on the particular evaluation. If the application was for 80 per cent, yes.

Mr. Passmore: Does it assume a four per cent discount rate?

Mr. Snelson: It assumes the financial discount rate.

Mr. McConnell: It assumes the corporate discount rates that are on record at the time of the evaluation. I would have to go back and check this, but I think the effective number is more in the vicinity of five per cent at the present time.

Mr. Passmore: We are looking at a 40-year life, an 80 per cent capacity factor, a five per cent discount rate and possibly a plant–

Mr. McConnell: We do not use one number. We use the official discount rates for each year, which vary from year to year.

Mr. Passmore: What figure did you use in the calculation of avoided cost then?

Mr. McConnell: We used the official corporate discount rates.

Mr. Passmore: Of?

Mr. McConnell: Of Ontario Hydro.

Mr. Passmore: Which you are saying are four per cent?

Mr. McConnell: No. They are a schedule and they are revised and updated every year. They are our expected cost of money, as described by Mr. Rothman yesterday, that take into account a slightly different rate for the equity component, as distinct from the debt component.

Mr. Passmore: Did it also assume that the total cost of this new plant would be the same or perhaps even less than the Darlington cost?

Mr. McConnell: In the historical ones?

Mr. Snelson: The avoided cost calculation would use the current estimate of a future nuclear plant cost for the nuclear component. Remember that the avoided cost calculations we have published at the moment are a mixture of nuclear plant, coal-fired plant and combustion turbines. So for each one, it would use a mixture of the cost. If we just used the nuclear component, we would get lower avoided costs, but we used a mixture of components so as to give a more representative value of the mixed development of the system.

Mr. Passmore: I think those assumptions that you are using–40 years, 80 per cent capacity factor, the discount rate and the potential costs–could be described and have been described by various witnesses as somewhat bullish assumptions and we would have to be very careful in assuming that those assumptions are going to be a representation of the long-run avoided costs of Ontario Hydro. Then you subsequently stated that the impact of an increase in the discount rate from four to six per cent would be a 27 per cent increase in the standard cost of a nuclear plant.

A number of witnesses appeared before the committee that would have liked to have seen such bullish assumptions being used about demand management and parallel generation as are being used about Hydro's long-run avoided costs.

Mr. Charlton: Bullish is in reference to the stock market type of bullish, not barnyard type of bullish.

Mr. Passmore: Thank you for that clarification.

Mr. Chairman: Perhaps we could move on to the next subject, it already being 3 p.m. I know Mr. McConnell did want to sum up, but we have two other areas the committee would like to cover. Perhaps the discussion can be briefer on these than it has been on the others.

The first has to do with transmission impacts. Some witnesses that have spoken to the committee and some members of the committee perhaps have the impression that transmission costs and impacts have not been adequately assessed in the formulation of the DSPS. We just wonder what your response is to that.

I think another issue related to that, and maybe you can respond to them both at the same time, is, if I have understood correctly, that when we are talking about independent or parallel generation, we did hear from Hydro that they had not

included it. They did not feel there would be any impact on transmission costs if various sites were developed in the province. We just wondered if you would comment and perhaps take us through that again and give whatever contentions you have in support that there would not be any reduction in transmission costs if we got parallel sites scattered about the province.

Mr. Marriage: Okay. I will try to keep this fairly brief. In terms of including the transmission, we feel we have adequately included those costs and impacts to the level needed for both the standard cost screening and also for the analysis of representative plans. We did include the incorporation cost for transmission for all of the options within the capital costs of the options in both standard costs and the representative plans. In terms of transmission and distribution costs, general costs for the system, both capital and operation, maintenance and administration costs, and the losses, those were included both in the standard costs and in the representative system plans.

We took into account in terms of supply options the fact that all of the transmission and distribution costs were included. In terms of nonutility generation, parallel generation, we assumed it would be local and, therefore, primarily only the distribution costs were included. Under demand management, being at the end use really, primarily there was no distribution or transmission costs associated with that option.

In the representative plans, we did it a little bit differently in terms of the bulk transmission. We looked at and identified some specific major transmission going to the year 2000. It is identified in the reports, but primarily it is east-west transmission in northern Ontario; north-south transmission between northern Ontario and southern Ontario; and some transmission between eastern Ontario and central Ontario. This was put in for a number of reasons.

One of them primarily was to connect the generation with the load and being able to operate the system in an economical and reliable method, to be able to move power from areas of surplus into areas of deficit in terms of generation. That bulk transmission in the representative plans was put in, but a general allowance for the rest of the transmission and distribution was included. The representative plans also included some potential environmental assessments of the bulk transmission components.

1500

All of this is included in a report, which I believe your staff has, 660 SP, Transmission Aspects of the Representative Plans. To save time, I think those interested can look into that report and see the details.

Again, in looking towards the future in terms of definitive plans, we will be using the best information we have on the costs and impacts of transmission associated with the various options and putting those plans together. We have a strategy element, 5.2.2, which indicates we will be taking both the transmission and the generation together through the approval process.

One question was raised, possibly by Mr. Marcus and I think by Mr. Argue in his issue paper. There was a feeling that we had missed the capital cost for the distribution and it is there–unfortunately, with restrictions on the tables–in the report on the financial evaluation of our plans. We included the capital and the operation, maintenance and administration for distribution and the OM and A for transmission all under one heading, called OM and A Municipal Distribution. The capital costs for the distribution were in there. Capital costs for the transmission are indicated in that report. We feel those costs have been adequately built into our evaluation.

In terms of the second question, Mr. Marcus and your staff here, I think, had also raised some questions in terms of why there was so very little difference in the transmission costs between some of the representative plans, looking at all supply versus all demand and the distributed plans.

That is a key point to remember, that transmission is not just added to the system to meet the load growth. We have to connect or incorporate generation into the system. Again, we have to be able to move that generation throughout the system in an economical and reliable manner. We also need to maintain strong interconnections with our neighbouring systems, to improve and maintain the reliability of our system and to take advantage of any economic opportunities to purchase or to export. There are many reasons why transmission has to be added to the system that have very little to do with the actual load growth or the load reduction in terms of demand management.

We had identified a number of transmission components that needed to be added to the system between now and the year 2000 in our analysis of representative plans. That resulted in a large common transmission cost, which really overwhelmed the differences in terms of the costs

associated with the plans between the demand plans and the supply plans. The differences were taken into account, but the fact of transmission required for the operation of our system and for the other reasons besides load predominated that analysis.

Also, within the plans, even the supply plans, we tried to maximize the use of our existing rights of way and minimize transmission for new options and therefore tried to look at the siting of the generation sources to minimize the transmission impacts. Again, this resulted in smaller differences between the plans with generation and without.

You can see, as I think Mr. Marcus pointed out, that a distributed plan where we were using small generation sources and demand management actually ended up with a lower transmission cost than the all-demand, the reason being we were siting small generation sources in areas which would reduce the transmission requirement more so than just a general reduction in the loads through demand management.

I hope that clarifies some of the questions. As I say, the standard costing is described in appendix F of report 652 on the options from the phase 1 DSOS, which I think you have, and the transmission aspects are described in one of the reports too.

Mr. McGuigan: Just as a for-instance, you are building a line or proposing to build a line from Pickering 1 and 2 to Windsor. If enough capacities in cogeneration came on within the city of Windsor or its environs, is there not a possibility that would mean you would not have to build another line?

Mr. Marriage: Again, part of that transmission is required to connect to the Michigan systems and strengthen our system. Putting in cogeneration is not going to improve the stability of the interconnected system. It might affect the timing. Again, it depends on the availability and dependability of these other sources.

Mr. McConnell: There are three basic functions of transmission. The first is to integrate generation, the second is to move power from generation to where people are going to consume it and the third is to interact with neighbouring systems to achieve economy. In the case of the transmission line you are talking about, that is basically for meeting the needs in that western part of the province, consecutively interchanging. There is a secondary effect that is associated with meeting the local needs, but it would not change the size of that particular installation, nor the timing of it.

Mr. Brown: A couple of days ago, I discussed with a witness the possibility of private cogenerators selling power to neighbouring jurisdictions with Ontario Hydro acting as a transmitter and probably the broker in the transaction. I would like your view. Is that a possibility or was I kind of dreaming?

Mr. McConnell: You were talking about generating power in Ontario and, say, selling into New England and New York and using Ontario Hydro and the United States system to wheel?

Mr. Brown: Right.

Mr. McConnell: If in fact that opportunity came about, I think Ontario Hydro would want to co-operate and facilitate its happening. With the high costs that exist in New England and New York, I do not think the probability will exist that it would be economic to do compared with doing the same thing in their own locales.

Mr. Snelson: You might be interested to know that Dow Chemical was here yesterday. We were involved in an arrangement some years ago with Dow whereby it generated power in Sarnia and we helped move it to its plant in Michigan. That was a wheeling arrangement over our system, perhaps somewhat similar to what you are speaking about.

Mr. McConnell: We would certainly want to co-operate with any party, if there was an advantage to Ontario, and that basically means an advantage to any party in Ontario.

1510

Mr. Brown: It occurred to me that the buyback rates in many of these states would be much higher than they are in Ontario, but you do not believe there would be much potential for this.

Mr. McConnell: Yes, but you have to ask yourself, would that New England or New York utility want to purchase from Ontario, including the transmission losses of moving that power over that distance? Would that indeed be economical? That is all I was really saying. Is it economical? If it is, we would certainly want to look at it.

Mr. Argue: Mr. Marriage, I have two questions, one of clarification. I want to get an understanding of strategic principle 5.2.2, when it mentions incorporation of transmission. I will read it to you. It says, "Approval for new transmission to incorporate new generation shall be sought as part of the generation approval process."

How far do you envisage that marriage of both generation and transmission approval? Does it simply reflect incorporation into the existing grid or would you envisage that at the same time as, for example, coming forward for the approval of a central generation facility that perhaps might require the expansion of, say, the southwest corridor or the eastern Ontario corridor? Would you come forward with the whole package together? I am trying to get a handle on how far you see incorporation of new transmission.

Mr. Marriage: Basically, as we see it right now, that would just deal with the incorporation of the generation.

Mr. Argue: Just into the existing grid.

Mr. Marriage: Yes.

Mr. McConnell: If it was the transmission line that performed the other two functions, then we would not be talking about it under 5.2.2.

Mr. Penn: The classic example of this is the Little Jackfish facility, where we have looked at the environmental question of the generation and the integration of the transmission system.

Mr. Argue: The second question I have, and perhaps Mr. Palmer can help us with this, is that when a parallel generator comes forward and says, "I would like to interconnect with your system," Ontario Hydro studies the capabilities of whatever transmission lines exist in the area and whether there is the capability of tying into, for example, the rural distribution system, given the size of the existing facility. Am I correct in assuming that the parallel generator has the obligation of paying the full capital costs for the new transmission facilities, wherever he can tie into the Ontario system that it can accept the power?

Mr. McConnell: Yes, and our avoided cost includes the avoided cost for the transmission on our behalf.

Mr. Passmore: I want a point of clarification, Mr. McConnell. Did you not tell us this morning that the transmission was a cost to Ontario Hydro when you were looking at a parallel generation proposal?

Mr. McConnell: When we determine the avoided cost, we determine the cost that we avoid for both generation and transmission, and then we expect the nonutility generator to pay for the costs of performing those two functions. So if one nonutility generation had 50 miles to go and another had two, the one that had two miles to go to our grid would obviously have an easier time of it.

Mr. Passmore: I understood you to say this morning, though, that the transmission portion was a cost to Hydro, as compared to Hydro building its own facilities, in which case transmission would not be a cost.

Mr. McConnell: I am sorry, no. I did not intend that if I said that.

Mr. Charlton: I have, very briefly, an extension of what we were just talking about. It goes back to a rather convoluted exchange that we had, probably mostly on my part, back in August around transmission. Most of what I was trying to get at then has been resolved, both through what was said then and from discussions I had with your officials out at the control centre.

At any rate, with cogeneration, or with other independent generation for that matter, where a generation proposal happens to be at a site where the power is needed and a generation facility on your part would require significant additional transmission, does the converse work in terms of the avoided cost that you would be prepared to talk to that cogenerator or independent generator about?

Mr. Snelson: I think the straight answer is yes. We would give, and we have given, cogenerators the benefit of higher avoided costs if they locate in a situation where it is particularly beneficial from a bulk transmission point of view.

Mrs. Sullivan: Just to clarify that, not above the avoided cost, however; still up to?

Mr. Snelson: Up to, but the avoided cost is higher if you are in a location that is transmission deficient and needs additional generation.

Mr. Chairman: The next item, or a couple of issues, I guess, surround the nuclear issue. Perhaps we could pool two of them to talk about.

The first one, strategy element 5.8, speaks of maintaining the nuclear option. I think the committee is interested in some comments from Hydro on what that might require. I suppose, obviously, building a reactor is one way of maintaining it, but if we leave that aside and say what it takes to maintain the nuclear option if you are not going to build a reactor, we wondered if you had any comments on what one might do in that situation.

The second relates to the question of overreliance that was raised by Dr. Hare, the idea of having overreliance on one particular technology. We just wondered what comment Hydro might have on that particular factor in the nuclear question.

Mr. McConnell: You wanted comments on the first and the third but not the second, is that correct?

Mr. Chairman: Yes, please.

Mr. McConnell: With regard to the first issue, having to do with the maintenance of the Candu option, very quickly, the maintenance of the life cycle of the Candu option requires a consideration of research to support the program, development, project management, design, manufacturing, commissioning, fuelling, operations, maintenance, retubing, decommissioning and disposal.

When we examine the program that is already committed, to maintain that program that is already committed for Pickering A, Pickering B, Bruce A, Bruce B and Darlington units, some 20 units, if you examine all those functions, we have to maintain those functions independently of whether or not we make another commitment. Boiling that all down, the problem having to do with the maintenance of the nuclear option, as to whether or not you commit more plants, focuses on three subjects: project management, design and manufacturing.

With regard to project management, although there is some tailored capability that is associated with efficient execution of a nuclear project, we think we can in fact maintain project capability on other projects so that it could be recalled as needed. The primary problems, therefore, focus on design and manufacturing.

In terms of manufacturing, we have been studying the rationalization of the manufacture of components that are needed for the Candu concept in the light of the expected hiatus from the time we made the commitment of Darlington in 1978 until some uncertain time in the future. We have successfully rationalized the maintenance capability in Canada in most instances. For example, the technology to manufacture calandrias, end shields and the like is a compatible technology able to serve other industries, and that is being done, so it boils down to a few critical operations, such as fuelling machines, that are unique to Candu and unique to Canada that we are attempting to maintain.

Our primary concern in the long haul is that if there was a continued hiatus, highly competent designers probably would not be prepared to stay in the business if there were no commitments being made and we would lose the Candu technology if in fact there was a very long hiatus.

1520

With regard to the specific question, if there was nothing brought into service until the late 1990s or the year 2000, that would not pose a problem for us in maintaining the design capability and we do have some rationalization to do in order to effect economies between the designers at Sheridan Park and the designers at Ontario Hydro.

Mr. Chairman: Can I interrupt for a second? Are you saying that after the year 2000 the only way to maintain the Candu capacity is to build a reactor?

Mr. McConnell: If you have a long hiatus, designers, who are very creative people, do not want to be sitting around doing nothing. They will seek a challenging job elsewhere and the chances of you getting them back when you want to gear up again is close to zero. If you maintain that hiatus too long, you will blow it.

Mr. Chairman: Is there no other way to keep the design facility in place?

Mr. McConnell: I do not think it is an avalanche situation, it is what you call an established deteriorating situation, and I do not think there is any avalanche that you go over, having to do with bringing the unit on in the year 2000. If you come along and say the first unit is going on in the year 2004, I do not think there is any precipice that you go over; it is just that you would be deteriorating.

By and large, we are not paying a large amount of money at the present time for the maintenance of the Candu option, but there are some expenditures and our strategy proposes that we keep that option open, but we could not continue to do so indefinitely.

Mrs. Grier: I have a short question on that. Keeping that option open can be done presumably by Candu in Canada or sales abroad?

Mr. McConnell: I think any projects in which Canada is involved in doing the design would tend to maintain that roster of capable designers available.

With regard to the last question having to do with Dr. Hare's observation to do with the review on the Candu safety, I think Dr. Hare acknowledged that he was responding to a question that he, in fact, did not investigate. He did not investigate the question of diversity. He was making a personal observation, but there was no dialogue that took place with Ontario Hydro on that subject.

Mr. Chairman: Others did bring it up, so I wondered.

Mr. McConnell: Right, others did bring it up and we brought it up and we talked about it in our report. I am just trying to put into context that i

was not a conclusion that Dr. Hare came to as a result of having conducted an inquiry; it was an observation as a citizen of this province, and similar observations have been made by others.

We did, in fact, make a presentation to you in early August having to do with the question of diversity. In an unqualified way, we have said diversity is a good thing left to its own–if that is the only criterion you are considering. Regarding overreliance in terms of one technology, I would like to repeat that one can analyse this from the point of view of energy and one can analyse it from the point of view of capacity. We are more concerned about overreliance of one technology in terms of capacity than we are in terms of energy. Let me explain what that means.

If you are talking in terms of energy and if you are talking about doing a comparison between hydraulic generated in Ontario, coal generated in Ontario, nuclear generated in Ontario and hydraulic purchased from our neighbours, we can achieve a certain amount of energy security associated with hydraulic by overinstalling and making sure that we design to what we call 98 per cent dependable; that is to say, we have enough resources from the hydraulic that in a drought year we are still 98 per cent sure we can keep running.

It does not pay you to do that when you get to a mixed system, so in fact we have less energy security from hydraulic than we do from the other forms of energy; that is to say, with coal we maintain an inventory of coal, so that if we have a strike and so on, we can ride it through; with uranium it is easier again to maintain an inventory because there is such a tiny amount consumed that we do not have any problems at the front end. But we are not concerned in any major way with regard to the droughts. They do happen, and when all-hydraulic systems, such as Manitoba's and Quebec's and so on, get hit we find ourselves helping them just as they help us on other occasions.

Our real concern has to do with capacity.

I guess we have lost our overhead. While the overhead is being put up, I would simply make the observation that of all the utilities in North America, at Ontario Hydro today, we find ourselves in probably the best diversity situation we have been in in this century and we are certainly much better off than most utilities, so we do not have a big diversity issue today. I will illustrate that.

On this overhead, you will see that we have per cent of the system up the left-hand side, and along the bottom we have a time scale going from 1950 through to 1988, and then projected to the mid-1990s. The extreme upper corner was when we were 100 per cent hydraulic. We were quite happy in Ontario to be 100 per cent dependent upon that technology because the cost was low and we had a high confidence in the hydraulic technology. Of course, as time has gone on, the percentage of the capacity in the system has constantly declined and now the hydraulic capacity is the smaller component.

You see here that the fossil option was coming on, starting at the beginning of the middle of the century, and it got to be equal to the hydraulic in the year 1970. Then it has sort of stayed level and is declining a little bit now. With the nuclear coming on here in 1970 and gradually growing, the nuclear and coal are expected to be roughly equal in the middle of the next decade. We have a pretty good balance at the present time.

The concern you have raised is really the question of not just the dependence on one technology, but the dependence that is associated specifically with the nuclear technology, which is what Dr. Hare raised. In fact, as I indicated to you before, we had a policy in the 1960s and 1970s of not wanting to commit more than two-thirds of the capacity to nuclear. You can see from that mixture that if we followed a similar two-thirds policy into the future as being an upper limit, it would take a very long time before you had a situation where your capacity installation significantly exceeded 60 per cent. That is not within the time horizon, and I am sure the strategy would have been reviewed and changed several times between now and that point.

1530

I guess the tradeoffs here in the real world are, how do you trade off the low cost you want with the environmental protection you want? In that particular case you, have a mixed bag because the nuclear represents concerns having to do with public safety and radioactive waste, as seen by the public, and the advantages are that it has a zero impact in terms of acid gas and a zero impact in terms of the emerging concern having to do with the greenhouse effect. Those are the tradeoffs you have to make between cost, environment and diversity.

Mr. Charlton: I would like to go back to this question of precisely what maintaining the Candu option as viable really means. Mr. McConnell, you were much clearer, in my view anyway, in terms of the design aspect. I think I understood fully what you said and I can understand how that will work, because you have

other things you can have a lot of those people doing, at least for a reasonably long period of time; not indefinitely, obviously.

We had two witnesses before the committee on September 27. The first was John Ahearne who was basically testifying about the development of the nuclear industry internationally and the prospects for Candu sales in the international market. Having spent a good part of the last number of years involved in that community, his assessment of the prospect for Candu sales internationally was very pessimistic, in my view. He essentially said that those places in the world where there is going to be a major demand for further nuclear facilities have either already opted into somebody else's system or have developed their own system. If you think through the major examples, that is largely true. There is probably some limited potential internationally in the developing Third World for the sale of a handful of additional reactors in the time frame we are looking at in DSPS, that being a sort of 20-year time frame.

We also had testimony from Ted Thexton from the Department of Energy, Mines, and Resources on essentially the question of what it meant to maintain the nuclear industry. I think–others can correct me if I am wrong–the discussion we had focused more on the manufacturing aspect of maintaining the nuclear industry in Ontario and in Canada.

His assessment was that give or take a little bit on either side, essentially you needed a reactor a year kind of approach. I understand that this is not absolute in the sense that if you miss a year you lose the industry and that what we are talking about is averages over a period of time, but essentially it seems to me that although I fully understand how you are in a position to maintain the design capability with all the reasonableness that has been professed in terms of the approach Ontario Hydro is trying to take to DSPS in the next 20 years, the best you are looking at is four reactors.

I understand there are some prospects for a fifth reactor in New Brunswick and a potential out there for perhaps four or five reactors internationally over the course of the next 20 years. Out of that, my question is, in 20 years, is eight or nine reactors enough to see the industrial component of our nuclear industry in Canada survive?

Mr. McConnell: Yes.

Mr. Charlton: You think it is?

Mr. McConnell: Yes.

Mr. Charlton: Seven, eight or nine reactors can carry that industry through the next 20 years without losing what has been sold as a major positive aspect, the jobs here in Canada?

Mr. McConnell: Yes. I believe eight or nine reactors during the next two decades–I do not know what your precise definition is, but if you were, for example, talking about eight or nine reactors coming on in the first decade of the next century and about being active in the last decade of this century, the answer is yes.

Mr. Charlton: The question is a very academic one because we do not know if we are going to sell any internationally.

Mr. McConnell: As far as the international question is concerned, I think I would simply say that I agree with you, if I understood what you said. Specifically, I believe the major benefit of the Candu reactor is for Canada; in so far as Canada is concerned, the major benefits have been and will continue to be in Ontario principally for the next decade. I would look upon the successful marketing and sale of a reactor to another country as a bonus or spinoff effect and not the principal merit of maintaining the option.

Mr. Charlton: So you think Ontario Hydro can maintain the option all on its own.

Mr. McConnell: I do not believe Ontario Hydro can maintain the option on its own in the long term. I think that to maintain the option in the long term, it is important that the federal government remain active, and as an absolute minimum maintain its ongoing commitment to research and development support.

There is no technology that can survive if it stands still. Everything in this world tends to get better and more competitive. I think that is an ongoing requirement. I think it would be–I am trying to think of another word than "political." I think it will be necessary for the federal government to remain in the act for it to be viable for Ontario to stay in the Candu business.

Mr. Charlton: Just one very brief supplementary that flows out of that: Are you happy with the apparent direction and commitment of the federal government to the ongoing research and development at this point?

Mr. McConnell: Yes and no.

Mr. Charlton: I do not like to use the word "political" either, but that was a political answer.

Mr. McConnell: No, we are not happy with the specific overtures of the federal government having made some research and development cutbacks, and yes, we are happy to see the report

of Barbara Sparrow saying the federal government had better get with it.

Mr. Charlton: Assuming it takes her advice, you are happy; if it does not take her advice, you might not be so happy.

Mr. McConnell: That is why I said "Yes and no."

Mr. Penn: I would like to add one very small thing to what Mr. McConnell said from a design and construction point of view.

I believe there is no other technology in the world that has had as much written about it as the design of nuclear plant. There are mountains of information in Ontario Hydro on Candus. It is a very standardized plant. That is why we have been successful, and the emphasis in the future is going to be not on designing it but on constructing it, and constructing it more quickly and more cheaply. When you look at the supply side, as Mr. McConnell said, there are very few products unique to the Candu reactors, the refuelling system and perhaps the pressure tube system.

1540

It may be, if it takes a long time for another commitment, that the amount of material and equipment supplied from Ontario or Canada might be less than in the past, but I am quite confident that the bulk of the equipment, apart from the ones I have mentioned, will be available on a competitive bidding process.

Mr. Charlton: Well, that may all very well be true, but it certainly changes at least some of the things we try to look at in assessing options for the future, if the Candu system is no longer quite so Canadian and specifically Ontarian in its makeup.

Mr. Penn: I just said "may"; I did not say "would."

Mr. Charlton: I understand what you said. But I am just saying, for Ontario Hydro itself and for committees like this, that changes the perspective from which you view the option as compared to others. I think, for example, of all the discussions we had around the purchase option and the negative-positive view of Candu versus purchase. If the prices are comparable with jobs in Ontario versus jobs elsewhere, you are going to have to get into all of that stuff the minute you lose the capability here to manufacture.

Mr. McConnell: We agree that would have a profound effect on avoided costs, on what options would be selected and what the future rates of Ontario Hydro would be.

Mr. Chairman: Thank you, Mr. Charlton. Are there further questions?

Mr. Runciman: I have a quick one, Mr. Chairman. I forget whom I was asking this of earlier, but I am curious, in respect to the nuclear option, about the availability of uranium into the future and talking about the high-grade ore. I was reading a 1976 publication, actually. It said, and this was from the United States Atomic Energy Commission, that there was only enough uranium left to last the western world for another 25 years. That was a 1976 projection. I know there was some reference in the response the other day to sources out of the ocean and the whole range of sources of fuel, but I gather those are perhaps not complementary to the Candu process. I am just wondering about the Candu process and the amount of high-quality uranium ore that is available into the future.

Mr. McConnell: The price we would pay for uranium in the future, like any fuel commodity, would in fact vary in terms of the demand for the product; that is to say, if the world were to restore a very large nuclear program, that would tend to drive the market price up even though it was still highly available.

In terms of price security for uranium for Ontario Hydro, in terms of Canada and in terms of the uranium that is here in Ontario and Saskatchewan, we have no concern in terms of the availability of all the uranium that would be needed for the next century, and also of continued availability at a relatively low price.

The need to go to the ocean, as far as I can see, is an awfully long way off. I doubt that would be in the next century. If that were necessary, then of course the price would go up a little bit unless the technology became very advanced. We would see the price of uranium coming out of the ocean as somewhat higher than winning it from the ground, but we do not have an availability-security or a price-security concern that is major.

Mr. Runciman: This is just another thing that I was curious about, which I guess does not enter into your cost projections in respect to nuclear, but what do you do in relation to insurance? I am thinking of, say, the Three Mile Island sort of situation where a private generator has to have liability insurance, I would assume, to cover the damages that are done to the surrounding communities. How do you recognize that need? Is there anything built into some sort of a fund to cover that possibility?

Mr. McConnell: Yes. Basically, Ontario Hydro, as the operator and owner of our Candu plants in Ontario, has to arrange appropriate

nuclear insurance in accordance with the federal law requirements of Canada. We are required at the present time to take out nuclear liability insurance, so we pay a premium to the insurance company each year for each unit and that provides a protection of up to $75 million. Thereafter, if an event occurs that exceeds that, the federal government provides that security.

Those levels–as to whether or not they are appropriate–are under review by the federal government at the present time and those costs that we pay are included in our nuclear cost estimates.

Mr. Runciman: So the up-to-$75 million is covered through an insurance policy with a private insurance firm?

Mr. McConnell: Yes, a pool.

Mrs. Grier: Supplementary to that, how does the $75 million compare with the actual cost to, say, Three Mile Island?

Mr. McConnell: As far as I know, the actual cost of Three Mile Island to date has been zero. I could be out of date but that is my understanding.

Mrs. Grier: To the utility, in terms of compensation and cleanup.

Mr. McConnell: Anything that has been paid to anyone.

Mrs. Grier: Nobody has got anything out of it.

Mr. McConnell: As far as I know, nobody has got anything.

Do not ask me about Chernobyl.

Mr. Chairman: Perhaps then we can move on, Mr. McConnell. We are only 50 minutes behind our schedule, which is not too bad.

Mr. McConnell: Do you want us to proceed then with our presentation?

Mr. Chairman: You had a summary, I believe, that you wanted to present. Why do we not proceed with that at this time?

Perhaps I could take this opportunity to welcome Mr. Franklin to the panel. I noticed you were in the room for a while. I hope you found our deliberations interesting.

Mr. Franklin: I did, and thank you for the welcome. It is good to be back again.

Mr. Chairman: As soon as our technical arrangements are made we will proceed. Mr. McConnell, I will turn the floor over to you.

1550

Mr. McConnell: Every time people have a son or a daughter, they get four years older and every time people have a grandson or a granddaughter, they become four years younger. This week, I am four years younger.

Before making this presentation, I would like to make some acknowledgements. The presentations that you have had up to now were largely made by the panel that was before you yesterday and today, and I would like to acknowledge that these people are all busy people with full-time jobs and some 90 per cent of the presentations that were made to you were developed during their lunch hours, their evenings and their weekends.

Mr. Charlton: What was the overtime impact on the rate structure?

Mr. McConnell: There was no overtime paid so it was a free issue. We undoubtedly will reward them with a dinner when we are finished.

Hedley Palmer has been the enthusiastic leader in developing the plans for demand management and nonutility generation. I think you can recognize the enthusiasm that he exuded as he talked about it over the last couple of months.

Mitch Rothman has been leading us in developing the detailed end-use understanding and paving the way for improved probability bandwidth forecasts, and that is quite independent of the ongoing saga of whether we have too many people, too few people or are just right.

Art Marriage is in overall charge of the integrated demand/supply study and he will be carrying on in charge of the development of the 1989 definitive plan.

Ken Snelson, I am sure you are already aware from his deep philosophical views, is our guru and has been our guru in developing the strategy. If you were impressed with it, it is to his credit and where it went wrong, I probably screwed it up.

Bill Penn has been leading the evaluation of supply options and has carried the ball in describing to you the status of the supply options. Bill lives in Peterborough, although he still works in Toronto. You can imagine with that going up and down the road together with the long overtime that he has been very heavily loaded in this process.

There are others you have met, and I particularly wish to acknowledge Craig Taylor who has looked after our administrative arrangements and Jim McConnach, who has been our technical co-ordinator.

In my opening remarks in August, I indicated that Ontario Hydro began the demand/supply option study, which we called the DSOS, in 1984. We undertook to review all of the demand options with particular emphasis on improving

the efficiency of electrical use of Ontario consumers. We undertook to review all of the supply options. This included the traditional, hydro, coal, nuclear and purchase options. In addition, we also undertook to review the alternative supply options such as wind, solar and waste-burning plants.

The final purpose of the study was to develop a strategy focused on meeting electricity needs in Ontario during the 1990s and beyond, and this strategy, as you have heard 1,000 times, we call the demand/supply planning strategy or DSPS.

I indicated to you that our study was designed to include public input, and we sought public views on the different options available and their values related to electricity service. Prior to developing the strategy, we obtained input from the Legislature, the government, electricity users, municipal utilities, electrical associations, special interest groups and the general public. I know that it has been very difficult for people to understand the difference between a strategy and a definitive plan. I can assure you that we have great difficulty inside Ontario Hydro on that same subject.

I would like to remind you once again of our intended purpose and scope for the DSPS. Of course, I am repeating because Mrs. Grier asked these very specific questions yesterday, and so I will just repeat them once more. Our draft strategy is the focus of this review with this committee. Our strategy is intended to be a set of principles, guides and priorities related to the demand and supply options. I stated at the outset of this review that we would explain and defend our draft strategy because we believe in it. We put a lot of effort into developing it and we used the input we got from the public.

We have been listening carefully to all of the views being expressed and that pile of white books back there on that table represents one copy of the material that was presented to you during the last few weeks. We are going to have quite a task in plowing through that and sorting out the things that affect the strategy and making the appropriate adjustments. We plan to modify the strategy in early 1989 after we have received the recommendations of this select committee.

To give you an understanding of our draft strategy, we presented to you considerable supporting information, and equally it was necessary for you to explore the implications of the strategy. However, I would like to remind you that the strategy is not intended to deal with the following.

We do not intend the demand/supply planning strategy to be a definitive plan. It does not outline what demand and supply options will be committed, how much, where and when. Presentations made to you by others did propose definitive plans. We will consider these proposals in the development of the 1989 definitive plan but do not intend to include such proposals in the final strategy.

The DSPS was never intended to be a study on how to do planning. We will change our methods and techniques from time to time and will learn from others. We received input on how to do planning, particularly from the technical advisory panel. Their recommendations are reassuring because we are currently using such a process.

The DSPS is not intended to include the delivery of demand and supply options. For example, we do not intend the strategy to cover how we go about designing, constructing and operating power plants, and also we do not intend the strategy to cover the detailed design, promotion, identification of impediments, evaluation of incentives, etc., associated with demand options. Nevertheless, we do value the ideas that have been put forward in the review process, which will help us as we gain experience with new incentive programs.

This overhead is to remind you of the overall process we have followed in the DSOS. When we receive the recommendations of this select committee, phase three will come to an end. In the fourth phase we propose to finalize the DSPS in early 1989.

We intend to apply the final strategy to the development of annual plans. Using this strategy, we have a target to develop a 1989 plan by midyear, and our annual plans will include plans for improvements to existing supply facilities, committed and uncommitted demand management, nonutility generation, committed supply facilities and purchases, uncommitted plans for supply and mothballing, restoration and decommissioning of facilities. We intend to develop these plans using our total least-risk, cost planning process, based upon a probablistic load forecast.

I would like to spend a few minutes just reminding people of things that have gone on in the past, to indicate the long time horizon that is associated with our decisions.

1600

Ontario Hydro's supply decisions have a long time horizon. Some 82 years ago, Ontario Hydro was created to develop economic hydroelectric stations to meet Ontario's needs. These stations

featured high capital cost and low operating cost. Today, these stations are still in operation and turning out low-cost power to Ontario consumers.

Ontario Hydro has also built transmission lines, some of which are over 50 years old. Coal-fired stations, some of which are over 25 years old, are economically attractive for peak-load applications. Today, approximately 50 per cent of Ontario's energy needs are coming from nuclear stations which are up to 17 years old and expected to run for at least 40 years. Nuclear stations, as with hydro stations, feature a high capital cost and low fuelling cost and low total energy unit cost for base-load application.

I would like to talk briefly about the long time horizons associated with demand. We reviewed with you that Ontario Hydro started its first demand management initiatives back in 1912, when our research division was created to develop more efficient and more reliable incandescent lights. Just as a side comment, Ontario Hydro manufactured those lights up until just before the Second World War. We developed insulated hot water tanks in the 1930s. In the 1960s, Ontario Hydro required that electrically heated homes be built to meet high efficiency standards at that time. We described the exciting research on heat pumps that we started in the 1970s.

During this century, the Ontario Hydro system has developed into one of the highest load factor systems in North America. This indicates we have already achieved substantial load-shifting results. This limits our potential to achieve further load shifting. As a caution, considering the long time horizons for demand and supply, the decisions that we make now will have an effect until the years 2040 to 2080. We should not be preoccupied with single-line, median forecasts or today's energy prices in establishing our strategy.

We have reviewed with you the three major components of demand management: (1) improving end-use electrical efficiency; (2) shifting consumption from peak to valley; (3) making Ontario more efficient through electrotechnologies. We have discussed with you the ways and means of achieving progress through information-driven programs, incentive-driven programs, research and development and co-operation with government on standards. To avoid lost opportunities, we have demand management programs under way, but they can be modified after we receive the recommendations of this committee.

We have received critical comments that we are not doing enough, we are too slow, we are not going about it the right way and our targets are too low. We have also received comments that our targets are unrealistically high, we should not count on demand management until after it is achieved and we are heading Ontario towards power shortages and economic dislocation. We have also received positive comments that our research and development is impressive, our market testing is soundly based and our evaluations are realistic.

Ontario Hydro's strategy gives high priority to demand management. The board, chairman, president and senior management are fully committed to achieving demand management results. We have a dedicated energy management branch to ensure effective results, and we would like to remind the select committee that it was Ontario Hydro, not the Legislature, not the government and not the public, that initiated the Demand-Supply Options Study. We are serious.

In developing our incentive-driven electrical efficiency programs, we are learning from others. In particular, the northwest United States has been very helpful to us.

During the course of this review, no subject has received more attention than demand management reductions through financial incentives. The 1988 target established by Ontario Hydro is a 2,000-megawatt cumulative reduction by the year 2000. This target has been criticized as too low by some and too high by others.

Ralph Brooks, chairman of the Electricity Planning Technical Advisory Panel to the Minister of Energy, said, "We do say in our report that we think there is probably more potential in what are broadly referred to as demand options than are suggested by Hydro's strategy document." Mr. Brooks went on to say: "I might say, as a marginal comment, that the panel did not have Hydro's June 1988 response to the minister on conservation and efficiency measures. That became public perhaps about the same time as our report did, so that was not part of the material that we had before us."

As we move forward, the target will be adjusted and the reality of incentive achievements will become known.

One of the members of the technical advisory panel, Mr. Litchfield, talked on how the utilities in the northwest United States were tackling demand management. With enthusiasm, he discussed the ways and means of achieving results.

You may be interested to know that we received from Mr. Litchfield a copy of the 1988 draft plan for the northwest United States, in which it has lowered its 1986 target reduction for conservation included in its plan from 14 per cent of load for the year 2005 to seven per cent for the year 2010. The major reason they reduced their target is that some of the conservation they had expected to have to promote will now be achieved through the introduction of higher efficiency standards for buildings and appliances.

This overhead illustrates Ontario Hydro's 1988 target for incentive-driven electrical efficiency of 6.4 per cent reduction for the year 2000. It also illustrates the target conservation included in the northwest US plan. Although we have some concerns as to whether or not we are comparing apples with apples, we suggest that our target is in the same ballpark as that of the northwest US.

Ontario Hydro has some opportunities for efficiency improvements that the northwest US does not have and lacks some that the northwest US does have. The northwest US started its programs earlier than Ontario Hydro. We think our target is ambitious.

With regard to incentive-driven peak shifting, Ontario Hydro proposes to shift some load from the peak to the valley. Our target is to shift 1,000 megawatts by the year 2000. Since Ontario Hydro already has a very high daily load factor of 87 per cent during its winter peak season, there is limited opportunity to further improve it.

The time-of-use incentive rate structure, which is the primary incentive to make this happen, has already been reviewed and endorsed by the Ontario Energy Board and will go into effect on January 1, 1989. We expect major early results, by 1993, of 580 megawatts. It would be a mistake to set a target higher than 1,000 megawatts by the year 2000.

1610

I would like to talk briefly, again going back to history, about technological change in the past. Over the lifetime of the electrical industry during this century, technology has been steadily changing. Change has generally resulted from manufacturers seeking a competitive edge. These efforts have brought many improvements in the use and efficiency of electrical products.

For example, transistors replaced vacuum tubes in radio and television, bringing enormous improvements in efficiency. They also opened up previously unthought of vistas in other electrical applications–for example, computers and robotics and the like. Microwave heating has replaced many heating applications in manufacturing processes and in kitchens. Fluorescent lighting has replaced incandescent lighting in commerce because of its better efficiency. The change goes on.

The speed at which technological change is generally adopted is subject to many factors: usefulness, cost, efficiency, appeal, lifestyle, information and so on. Utilities, governments, industry and others can accelerate the penetration of energy-efficient applications through aggressive promotion and information programs.

Ontario Hydro has such programs in place. You will recall that this morning Mr. Palmer emphasized that our advertising program at the moment is dedicated to this subject.

Standards: Ontario Hydro is in full agreement that electrical efficiency can be achieved through standards. We suggest that the ball is in the hands of the federal and provincial legislatures and governments. Ontario Hydro has done a lot of research on this subject and has co-operated with governments in the past. We intend to continue this co-operation, as stated in our strategy.

Ontario Hydro's basic load forecast includes the expected effect of continued technological change, all information-driven programs and government standards.

I would like to talk briefly about the Hydro family. The electric service in Ontario is the combined effort of Ontario Hydro and some 315 municipal electric utilities. The continued success of the partnership requires ongoing close co-operation and understanding within this family.

On behalf of the Municipal Electrical Association, its chairman, Carl Anderson, made a presentation to you. I would like to quote from his submission:

"Of necessity...demand management will largely be implemented by municipal utilities. They will be heavily involved with Hydro in reviewing and approving the demand options and in negotiating the implementation with their customers."

Mr. Anderson's remarks underscore the importance of our strategy element 3.4, which is, "The planning and implementation of demand management options will be undertaken in close co-operation with the municipalities."

Nonutility generation: We acknowledge the considerable comment that has been expressed with regard to nonutility generation, otherwise called independent generation or parallel generation. Our strategy calls for Ontario Hydro

making economic purchases from nonutility generation a high priority; our strategy calls for Ontario Hydro promoting the development of economic nonutility generation in the Ontario community; and our strategy calls for Ontario Hydro paying up to but not exceeding full avoided cost.

We have discussed with you avoided-cost determination. By purchasing electricity from nonutility generation, Ontario Hydro avoids building new facilities to meet new requirements. For example, let us suppose that our long-run costs are 3.5 cents per kilowatt-hour, expressed in 1988 dollars, to expand its facilities. Ontario Hydro can avoid this expansion by paying up to the 3.5 cents per kilowatt-hour for nonutility generation. This example is simplistic, as we discussed this morning, because the design and operation of a power system is much more complex. Both generation and transmission are included in the determination of avoided cost. Obviously, independent companies or persons, in their desire for profit and opportunity, want the value for avoided cost to be made as high as possible. Ontario Hydro consumers are best served by the avoided cost being as accurate as possible.

The strategy calls for Ontario Hydro to encourage the development of economic nonutility generation and to pursue the maximum amount available and needed. Are there any practical limits to the amount that can be expected? The same forms of primary energy are available to nonutility organizations as are available to Ontario Hydro. That is oil, gas, coal, peat, wood, waste, hydro, wind, solar and so on. Cogeneration, which is an efficient process, refers to any primary energy being converted to both steam and electricity. We expect the majority of economic nonutility generation in Ontario to be in the form of cogeneration in which gas is used to generate steam and electricity. This is inherently limited to major industries and major commerce using large amounts of steam.

Ontario Hydro recognizes that there are opportunities to learn from the experience of other utilities. Accordingly, we are learning from other utilities as well as sharing our progress with others. This learning process not only involves adopting those techniques and methods that have been successful but avoids those approaches that have resulted in failure.

In this overhead you can see that the average electricity prices in the United States have risen dramatically relative to Ontario as shown. Ontario has little or no indigenous oil, gas and coal. Ontario has limited hydro resources. Ontario's opportunity for low-cost electricity is no better than that in the United States. If a utility has high costs and therefore high rates, then demand management and nonutility generation appear more attractive. On the average, Ontario Hydro costs are lower than those in the United States, and we expect our avoided cost value will continue to be low.

In summary, we suggest that Ontario should continue with practices that have been successful here and elsewhere and avoid practices which have failed here and elsewhere.

The strategy gives priority to the development of the remaining hydro power in Ontario. We have reviewed with you our strategy to develop this remaining hydro power in an orderly manner. We have interim plans already under way. We are proceeding with the environmental assessment of Little Jackfish in northwestern Ontario and Sir Adam Beck 3 in Niagara Falls. The remaining economic energy to be developed is approximately six terawatt-hours, corresponding to one and one half years of energy load growth in Ontario.

Major supply options: We have reviewed with you the advantages and the disadvantages of the other major supply options: coal, oil, gas, nuclear and purchases.

Gas is attractive to meet short-term needs when we are at risk of power shortages. It has low acid gas emissions. It contributes to the greenhouse effect, but at one half the coal rate. We do not expect gas to be competitive with coal and Candu nuclear over the longer term–that is, 40 years. It is not indigenous to Ontario, but is a Canadian resource.

Oil has characteristics similar to gas. Coal is economically attractive to meet peak power requirements. It poses major short-term acid gas concerns that cannot be overcome with new technology. However, as with gas and oil, it poses a long-term greenhouse concern. It is abundant but not indigenous to Ontario.

1620

Nuclear has the advantage of proven low cost for base load application. Uranium is abundant and indigenous to Ontario and Saskatchewan. Nuclear poses concerns to the public about safety and waste disposal. It has the advantage of no acid gas emissions and no greenhouse effect.

The strategy gives high priority to demand management, nonutility generation and orderly development of the remaining hydro supply in Ontario. Ontario must plan now for major new

supply, major purchases and/or major fossil units and/or major nuclear units. There is an urgency to make new commitments.

Ontario Hydro will be publishing its 1988 long-range load forecast in December 1988. This afternoon, after this presentation, I shall distribute our new five-year, short-range forecast–it has already been distributed, has it?–which has just been developed. We would draw to your attention that we have increased our load forecast for 1993 by six terawatt-hours, which is roughly equal to one Darlington unit. That information simply reinforces or re-emphasizes the concern we have with urgency at the present time.

As explained during the August hearings, there is no generation surplus in Ontario at this time. Darlington will meet the 1987 median load growth forecast of the mid-1990s. We have no major supply commitments beyond Darlington. This further accentuates the planning urgency for new commitments.

I would like to make just a few comments having to do with the approvals process. Many organizations appearing before you have suggested that we need a better process for approvals. Ontario Hydro recognizes that the approvals process is established by the Legislature and government. We share in the desire to have an improved process, as indicated in our strategy element 5.2.1.

We endorse environmental reviews to meet local concerns and suggest that such reviews be conducted within reasonable time limits. We recognize the conflict of selecting options to meet the common needs of the province–that is, a generic plan–and the requirement to debate locally the needs for each specific project. We do not have any magic answers, but we would note that, in recommendation 20, the technical advisory panel has suggested an independent review of Ontario Hydro's plans. We are anxious to co-operate with the government in finding a better way. Until change is made, we will, of course, conform with the current processes.

Planning for uncertainty: Some persons have suggested we should develop and implement plans to meet a load above the median forecast to ensure reliable power supplies in the future. Our strategy requires our planning to be based on a bandwidth load forecast that covers a reasonable range of possible outcomes.

We propose that decisions be based on a total least-risk cost-planning process. This process will include a probabilistic evaluation of: the modification to plans required if loads are higher than the median forecast to minimize shortages and maintain system economy; also, the modifications to the plans required if loads are lower than the median forecast to minimize surplus capacity and maintain system economy. To illustrate the range of possible future outcomes, plans will be produced showing the development of the system if the load follows the upper, median and lower load forecasts.

I would just like to review once again the five basic strategic thrusts that underlie our strategy.

1. In the 1990s, your electricity supply will largely be met with the power system which is operating today or already under construction. However, we do have a lot of work to do in rehabilitating ageing hydro stations, ageing transmission and ageing thermal stations. We also must make sure the nuclear stations achieve their full economic lifetime.

2. To meet the future, we are involved in an aggressive demand management program to minimize the growth. This involves peak-shifting programs and improved electrical use efficiency. Close co-operation is needed among Ontario Hydro, the municipal utilities, all customers and the electrical industry. Although demand management is not new, we are proposing a major increase in its intensity.

3. We are also proposing to achieve part of the needed supply by purchasing power from private developers. We will be particularly encouraging renewable generation, such as small hydro and wood waste, and we will favour fossil generation which employs high-efficiency cogeneration.

4. We propose to develop all the remaining economic hydroelectric generation in an orderly way.

5. We expect there will still be a need for further major new supply options, such as coal, oil, gas and nuclear. We are also considering purchases from Quebec and Manitoba as a good option, if the price is right. New plants are also required to replace the old plant, which is economically obsolete.

We feel this strategy will best meet the future needs of Ontario and provide the flexibility to cope with an uncertain future.

We request you focus your comments on the strategy. That will help us most. We have given you mountains of paper, and you have received other mountains of paper during the last few weeks. We have distributed to you this little, teensy-weensy, thin document, and that is the essence of our four years' work. That is what we ask you to focus on.

It may be out of order for me to be judging the performance of this select committee, but I will do so because I am going to retire anyway.

I have said before, and I would like to repeat, that I have been sincerely impressed with the depth of understanding gained by this committee in such a short time. Your abilities to ask simple, straightforward, penetrating questions have been particularly noteworthy. We look forward to reviewing the recommendations that you develop and we recognize that the review and approval of the 1989 definitive plans will not be an easy process. We do hope, however, that this process will lay a foundation of better understanding between the Legislature and Ontario Hydro.

For my closing remarks, I would simply like to say that you have provided us the opportunity to explain our strategy to you. The presentations to you by others have also been valuable to us. I would like to suggest that the understanding that has developed among you, the elected representatives of this province, and us, who provide this essential electrical service, and the many people who have appeared before you is more important than the strategy which has been the focus of our interchange.

Demand management is not new to Ontario Hydro. The notion of incentives to make things happen is not the invention of electrical utilities. The notion of improving electrical efficiency is not a new concept. However, aggressive promotion of efficiency improvement through utility incentives is new. Let me emphasize Ontario Hydro's commitment to electrical efficiency through information-driven and incentive-driven programs by quoting Victor Hugo, "There is one thing stronger than all the armies in the world, and that is an idea whose time has come."

1630

Mr. Franklin: Lorne McConnell opened his sideshow a minute ago with a compliment to all of the people who appeared before you in the last couple of days, characterizing them by saying that they worked long hours and had full-time jobs quite apart from this one. His introduction of me was notable. I guess I represent the part-time employees of Ontario Hydro here this afternoon.

He closed his comments by being very complimentary to this committee. I think that was quite an achievement after only two months of hearings with you, because I have yet to gain his compliment after two years of working with him. He made a passing comment to his retirement in February. I am glad he brought that to your attention, so there will not be any misunderstanding about that.

I am pleased to be here on the concluding day of your hearings. I see it as an opportunity to discuss anything which may be on your minds that has come up since I appeared here on August 2.

Two months ago when I was on that opening panel, I did my best to convince you that Ontario Hydro is changing in many ways. We have a commitment to change, and some of the things Lorne was talking about here just a few minutes ago reiterated that. I also tried to present at that time that the DSPS was both a manifestation of change and also an instrument of change for Ontario Hydro, and I see it in both those ways.

Since I was here, I know you have had a number of groups come forward to cast various opinions about Ontario Hydro's ability or willingness to change. Some of them were very complimentary and presented evidence of the change that is going on. Others took the opposite view and said we were incapable or unwilling or not serious about change, about demand management and about nonutility generation.

I know we have those sceptics and, even though they are wrong, I do not fault them for it. I understand how difficult it is to perceive change in a large organization. Sometimes critics are as slow to change as authors. But I assure you we have instituted a program of change. I know those sceptics are looking for evidence, for changing patterns in our activities and the way we go about our business. Big companies do not embrace change quickly, as I said on August 2; particularly, big, successful companies embrace it slowly.

I know utilities are known primarily for supply-side answers, not just Ontario Hydro, but almost all utilities. It is quite fair for people to ask the question, "Why should Ontario Hydro embrace demand management or nonutility generation now?" I can think of two very good reasons.

The first one is that it makes darn good business sense. It may not have made it in the past, because of avoided costs or whatever, but it makes good business sense now. If it makes good business sense for Ontario Hydro, it does make good business sense for its customers. We are not advocates of conservation for conservation's sake and we are not advocates of nonutility generation for its own sake, but we are advocates of it where it makes good business sense, and that is one reason we would pursue it.

Here is another, if the first is not good enough. The second is that over the past five years, since 1983, we have been growing at about five per cent a year in energy demand for this province. In 1988, we are at about seven per cent. We have largely absorbed the capacity excess we had in

the early 1980s and late 1970s. If we continue to grow to the year 2000 at only 2.6 per cent, by the year 1996 the capacity that is coming on line from Darlington and the little that we have now will be absorbed.

We cannot, as you know, build a new generating station or rely on the traditional large-scale generating stations to serve after 1996, if we wanted to. The best we can do is the year 2002 under normal approval processes and construction processes. If we had no other imperative, somehow or other we have to do different things between 1996 and the year 2002 in order to get there. If doing what is in the best interests of our customer is not enough, surely the prospects of running out of reliability–because that is what it would be, reliable power by the year 1996–is enough to get anybody up and running.

We do intend to pursue the things you saw here. We do intend to pursue the remaining hydraulic in this province. We think there is about 1,000 megawatts of power in this province that we would like to pursue on our own. If one is looking for evidence, take as evidence the recent announcement of the definition plan for the upgrade of the Niagara River. Millions of dollars are being spent on that, where one would not do it for public relations purposes only.

We are going on with the environmental assessment for Little Jackfish, with both of these happening since I was here on August 2. There are a dozen more of those kind of sites in northern Ontario that we would like to pursue. There are hundreds more in northern Ontario we would like the private sector to pursue on our behalf, smaller sites, where they are perhaps quicker on their feet and can do it cheaper than we can. We will urge them and we will give incentives, hundreds of millions of dollars of incentives, between now and the year 2000 to encourage them to do that.

We are supporting as enthusiastically as possible the new parallel generation advisory council, which will have its first meeting, I understand, on October 14. That is another piece of evidence that we are serious about what we are doing.

I happen to believe in the competitive bidding process for establishing the rates that we should buy, purchase rates, under the ceiling of avoided costs. Private sector people like competition, I hear. Well, that is the best competition I know of that we can give them.

We do intend to pursue demand management. We know there about 3,000 megawatts of demand management between now and the year 2000 that we want to achieve, that we have to achieve, if we are going to get from here to the year 2002. There are incentive-driven demand management programs which make up about 2,000 of that 3,000 megawatts. We have doubled that target since that DSPS was printed.

There is another 1,000, the time-of-use rates. Lorne explained to you why you could not get more than 1,000 if you wanted to, because you just simply shift the peak from one period of the day or year to another.

I know that there has been some questioning about our targets for demand management. The minister questioned them. I believe his questions relate more to the nonincentive-driven demand management programs than to the incentive-driven. The nonincentive are in the realm of appliance standards, building codes, things like that. They are not within Ontario Hydro's realm. They are in the realm of the minister. We have a role to play and we will encourage and support the ministry in everything we can to achieve whatever those nonincentive demand management targets will turn out to be.

Even if all this works, even if we get from the year 1996 to the year 2002, I remind you that is assuming the 2.6 per cent growth rate. What if it is three per cent or what if it is four per cent? What are we going to do if it is 2.6 when we get to the year 2002? In my opinion, we had better be ready for the year 2002. That means we should not wait until 1996 until we see how much we are getting from these other sources. We should get our act together. We should have our technology chosen; we should have our preliminary approvals on the shelf and we should have our design ready. It takes five or six years just to do that.

If we do that and we have it ready, we can decide collectively when we want to put the shovel in the ground. We can put it in the ground as early as possible or as late as possible, depending upon how successful we are in these other areas. When we do that, we will not be the one making the decision. It is not our decision about what will be produced in the way of the next generating station and it will not be our decision when. It will be society's decision through the Legislature.

1640

But we need your advice on our principles. It is not an easy chore. There is no perfect solution. I wish there were, but there is not. When we have your advice and fold it in with the advice we are getting from everywhere else, we are going to prepare the very best plan we can, a definitive

plan. We are going to present it to the public by mid-year next year.

It will be based upon our best professional judgement and somebody else will then make the judgement on that. It will not be an easy decision, but as Lorne says, we will be making a decision we will be living with perhaps until the year 2040; so it is an important one. I urge you to give, as I know you will, serious consideration to the things you have heard here, not just from Hydro but from other witnesses too, and to give us your best advice possible. Thank you, Mr. Chairman.

Mr. Chairman: Thank you, Mr. Franklin. Are there any questions or comments from the committee?

Mr. Passmore: As you pointed out, Mr. Franklin, there have been a number of opinions expressed over the course of the last six weeks and it has been a really interesting exercise for those of us here sitting on the committee.

There have been some sceptics come forward, as you have suggested. Many of them have used some fairly strong language about the load forecast and Hydro's standard costing approach and so on. In the summary he just gave us, Mr. McConnell indicated that Hydro is anxious to co-operate with the government in finding a better way. That was in response to the recommendation by the technical advisory panel, recommendation 20, which suggested an independent, ongoing technical review of Ontario Hydro.

That was one of the suggestions made by so many witnesses that I could not even begin to enumerate them all. I am just wondering whether you agree with all the sceptics, whether or not the committee agrees with all the sceptics or indeed with Ontario Hydro. As things stand now, the rules of the game were made by Hydro. It is as if you are the rule-maker, the rate-setter, the player and the referee. A number of witnesses have come forward and said they would like to see a situation evolve where some other body could be an independent third-party arbiter to assess whether Hydro was acting in the ratepayers' best interests.

The committee is wrestling with that issue. How would you react to the suggestion that some independent, third-party arbiter be introduced into the system?

Mr. Franklin: I think people who make that charge probably ignore the reality of the situation. There is not a generating station built in this province, not a transmission line built in this province, that has not had a governmental stamp. We do not decide that there is going to be another nuclear station. We do not decide where it is going to be. We do not decide it is going to be a 500-kV line between here and there. There are independent tribunals that do that, so to suggest that somehow or other Ontario Hydro makes the rules about what it will install and where it will install it and when it will install it ignores the facts. I keep asking the question, because they are always talking about edifices, "Tell me one edifice Ontario Hydro built that did not have governmental approval?" I will ask it of you.

Mr. Passmore: The suggestion that was made came largely from people working in the demand management and parallel generation industries. The suggestion made was that there is a dispute over whether Hydro is being as aggressive as it can in the assumptions it makes about demand management potential and parallel generation potential.

There is a growing body of opinion in the industry that the avoided cost Hydro is paying does not represent the true value of power. The problem is that those people can express opinions, but when they sit down to negotiate a contract, they are negotiating with the rule-maker and the one that is the final arbiter.

Those people were not talking specifically about the building of new capital plant by Hydro. They were talking about their own ability primarily to get into the generating side of the business and compete with what was perceived to be a generation monopoly.

Mr. Franklin: I have read some of the testimony before this committee and there have been people who argued that. There were also people who argued, "Leave us alone; we do not need any more government regulation, thank you very much, we can do this on our own," and are quite happy with the way the relationship between the independent generators and Ontario Hydro is evolving. I know we will never get consensus on that, and there may very well come a period of time when it is essential to have an overview of these avoided costs, for instance, since they form the basis of power purchases and things like that.

When that time is right, I would not have any hesitancy about co-operating in such a thing as that. I am not sure the time is right. As you know, you have heard the divergent views of that before this committee, some proposing that we should do it right away and some saying, "Leave us alone, we can work this out on our own." I guess when the time is right we will have one. I do not shrink from that. It is just a question of timing, I think.

Mr. Passmore: On the question of timing, of course, according to a number of witnesses, the time is right now. I guess that is the thing the committee is struggling with and I guess your answer to me is that you are not sure whether the timing is right now.

Mr. Franklin: If I thought the timing was right now, I would say so. I do not happen to think the timing is right now, but I am not the only voice in this. As you say, some have argued both sides of that question. That is something this committee will have to wrestle with.

Mr. Passmore: Does that not make the point? You are suggesting that there are those who have an opinion different from your own.

Mr. Franklin: Sure.

Mr. Passmore: Is not the point those people are making–

Mr. Franklin: Some have the same opinion.

Mr. Passmore: Yes, of course.

Mr. Franklin: Does that not make a point?

Mr. Passmore: The issue was raised, actually very succinctly, in Mr. McConnell's final submission when he says on page 39A, points 3 and 4:

"Obviously, independent companies or persons, in their desire for profit and opportunity, want the value for avoided cost to be made as high as possible.

"Ontario Hydro consumers are best served by the avoided-cost value being as accurate as possible."

I want to endorse those comments. I think they are spot on. The problem is that the way things are now, Hydro basically decides what is in the best interest of the ratepayer, and as I said, a third-party arbiter needs to be introduced to decide whether that is appropriate or not.

Mr. Franklin: I cannot add to what I have said. There are those who agree with me and there are those who agree with you. This committee is in the arbitrator's role and will have to make a recommendation on that. When the time is right, we have no cause or reason to shrink from that.

I would much prefer to see some kind of a competitive bidding process put into place too, because I hear so much about how the private sector likes competition. I would like to satisfy them on that, give them that opportunity.

So, sure, when the time is right, we will do it.

Mr. Passmore: A matter of timing; that is fine.

Mr. McConnell: I guess, Mr. Passmore, when I was making the presentation, I had an old copy and I missed a page.

Mrs. Grier: It was 39B.

Mr. McConnell: I apologize for that. In that we did specifically indicate that we would welcome a periodic review of Ontario Hydro's avoided cost.

Mr. Franklin: It is a bit like the Candu cost study which is going on, or will be going on in due course. When I was here last, I mentioned that Ontario Hydro had launched its own; an independent review by external people of the costs of Candu. Why is that? Because we wanted to have a second opinion on our own internal costing. We do not want the wrong number, we want the right number, whatever it happens to be.

It is true that it is the same with avoided cost. There is no sense in us striving to have the most economic system we can possibly have and then somehow arbitrarily or deliberately fudging on what the proper number is for avoided cost. We would be defeating everything we set out to do. When there is a consensus that we need to have that avoided cost overview, then by all means we should have it.

My only question is, we do not even have consensus within the independent generating community as to whether it is mature enough and right enough now. I say that when they are of a single mind, perhaps that will be some evidence that the time is right. That is all.

You also know that avoided costs are not a single number. Avoided cost can be different depending upon the circumstances, whether there is transmission involved or whether there is not. It is not as simple as picking a single number and saying that is avoided cost.

1650

Mr. Passmore: Avoided cost comes first; contract terms and conditions follow.

Mr. Franklin: I think they would come at the same negotiating table, if it were me anyway.

Mr. South: To say something that is sacrilegious–maybe Mr. Passmore's point–I do not think, as has been expressed, that the different sides will agree on what full avoided cost is and I would like your comments on one of the ideas that has been expressed before: "Let's split Ontario Hydro in two. Let's form a transmitting entity. Let's form a generating entity. Then let the transmitting entity buy from whoever can put forth the proposal that is least costly."

Mr. Franklin: I do not think the splitting apart of an organization is going to change anything. That does not necessarily lead to a different rate or anything else. You could have that same generating–

Mr. South: You would have the impartial arbiter Mr. Passmore is talking about, though, that here is a transmitter that is going to buy electrical energy wherever it can get its best price.

Mr. Franklin: That does not alter my answer. Ontario Hydro should be able to do that too. That independent generator you are talking about, whether it is buying power or not, will still have the same biases you want to suggest Ontario Hydro would have. It is still either going to create its own generation or it is going to buy it. Therefore, the same difficulty would arise for that management as you are saying would arise for the present one, unless you intend to turn the generator into some kind of private sector company, and then you would in effect be moving away from power-at-cost principles and public power into some other kind of power. I do not know how just forming a division between the existing branches of the company is going to change the principles by which the remaining company would exercise its business, in any case.

Mr. Matrundola: On that note, if one of the transmitting lines or the generating stations were privatized, perhaps there could be some merit to it, to having the transmission line as one entity and having generating plants that are different entities, one of which could very well be Ontario Hydro whether it is a generating station or whether it is the Hydro transmission line. Perhaps there should be another body there. Perhaps we should give some thought to that as well because it might create a little bit of competition, and then we might see better results. In my opinion, in this committee we should look at every avenue in order that we can look after the best interests of the public, which I believe is the ultimate goal, to reduce costs or at least not increase the present costs if at all possible.

Mr. Franklin: I do not think that a privatized, private sector power company for Ontario would be able to provide power more cheaply. One of the reasons power is more expensive in the United States is that it is primarily private sector companies providing it down there. That is one of the benefits of public power. If we want to forgo those benefits, it is fine with me, but if you are going to do that, let's not do it piecemeal– let's privatize Ontario Hydro and get it over with. If you think there are benefits in private power, then let's do it dramatically. Let's do it properly and not do it by nibbling Ontario Hydro to death.

Mr. Matrundola: I always look at every situation with an open mind, and I am always open to new suggestions and so forth, to try to find out the best way to supply energy at least possible cost and also in the most efficient way, and that is my point.

Mr. Franklin: Your objectives are great. I just think that the difference between public power and private power is a commercial rate of return after tax on its investment, and I think you could not help but drive power rates in this province up maybe 40, 50 or 60 per cent. I am not personally philosophically against that. I am just saying if you are going to do that, whether you do it holus-bolus or piecemeal, by this particular aspect of the system or another, you should do it knowingly and wittingly and understanding what the result will be.

Mr. Matrundola: Quite understandable. Perhaps if we were to look into that, it might prove to be beneficial. I do not know.

Mr. Franklin: There was a presentation some years ago before the Ontario Energy Board about what the rates would be under a private sector rate-of-return regime. As I recall reading the material, it forecasted increases in rates of 60 per cent.

Mr. Matrundola: I see. I have one more question, please. I believe you were talking before about the growth rate. Is that in the demand of Hydro, that you expect and forecast a growth rate of 2.6 per cent by the year 1996 or the year 2002?

Mr. Franklin: That is the growth rate, as recall, that was used in the demand/suppl planning strategy. Our most recent examinatio of that, as I also recall, looks out five years an says it will be something in the order of 3.3 pe cent.

Mr. Matrundola: I see, but that is th increased demand rate of energy needed?

Mr. Franklin: Yes, that is right.

Mr. Matrundola: I suppose that is based o the forecast of growth of population in Ontario?

Mr. Franklin: Partially, yes.

Mr. Matrundola: Do you have any numbe on the expected growth of population in Ontaric We now have somewhere between 9 million ar 10 million, about 9.5 million people in Ontaric By, say, 1996 or 2002, do you have any ide

what the population forecast is going to be in Ontario?

Mr. Franklin: Yes, we do. I do not have it personally, but it is available and it is one of the foundations upon which we build our forecast. We can make that available to you.

Mr. Matrundola: I would appreciate that very kindly.

Mrs. Sullivan: I want to further explore the approvals process. One of the things that has become clear, not only from these hearings, but from interventions before, is that one of the problems in terms of new supply is time lines of the approval process, although there is recognition that the approvals process is a vital part of the structure. I am interested, in that we have not really had an opportunity to discuss at any length in these hearings the approvals process, which I think is unfortunate.

I was pleased that Mr. McConnell included today an indication that Hydro really does want and would look forward to a public review of avoided cost and so on. I am also wondering what other areas, including eliminating duplication, by example, of the argumentation in the environmental approval process would be of use and what other areas Hydro might want to have explored in a public review process.

Mr. Franklin: I am kind of talking off the top of my head now, but I can give you some of my own ideas on that. First of all, I think there may be some way of banking approvals, of getting approvals in advance and banking them, as I suggested that we do, putting them on the shelf. Then when you can prove need at some later point, with a much smaller hearing, a much quicker hearing, you would be able to produce that generating plant or that transmission line faster. I would suggest perhaps a system in which you could bank approvals.

Mrs. Sullivan: I suppose there would also have to be some measure of recurring review of a banked approval.

Mr. Franklin: I would think that the environmental effects and things like that would probably be dealt with in that first hearing. The second hearing would be one of need: could you establish that this was essential, that it was time to get on with that process? That is one area, I guess, that I would suggest that we might make approval on the present regime. I know it is probably heresy to say, but lots of tribunals are under time deadlines. I understand their existing procedures are open-ended.

It seems to me that there should be an obligation upon the proponent, in this case Ontario Hydro, and an obligation upon those people who are opposed or in support of it to work within certain time guidelines. I think that in itself would sharpen people's attention and shrink the time lag, because as we all know, according to Parkinson's law, it will take whatever you give it. I think that is another area where the existing system could be improved by the implementation of time deadlines prescribed in legislation. I am sure my colleagues have others too, but those are things that come off the top of my head.

1700

I think this is a subject which is very essential, because if we can shrink that 12 years that we talked about, from the time of an idea, to get on with it, to the time we can actually get the generating station working, if we can do that either through the approval process or through the construction process, then it gives us more flexibility. We do not have to make 12-year decisions; maybe we can make eight-year decisions or nine-year decisions. While that is still difficult, it is a lot easier than 12 or 13 years.

Mr. McGuigan: Could I just make a comment on that? I would love to see banked approval system, but I am frightened by it. There is the Charter of Rights, for instance, and you know your own experience a number of years ago when you had hearing on a Hydro line from Grey county and the judge overturned the hearing and made you start all over again. It was our distinguished member from Grey county–whom I will not mention–who perhaps brought that all about. The argument was that the public had not been given the proper notice and so on. The first hearing was thrown out and you had to have a second hearing.

I would be afraid that if we had banked hearings–there are two sides to it. People would say: "You are definitely going ahead with it. Otherwise, you would not be having this hearing." On the other side of it, when the hearing was over and then you did go ahead with it, people would say, "We didn't really think you were serious about the problem," and you go to the judge and you have got to do it all over again.

Mr. Franklin: But I think the process as it works is that there is a period in time in which someone can appeal to cabinet to have an override. I do not know–I am not a lawyer–but I assume that once that appeal process has been exercised or not exercised because of time lapse, approvals are final. Unless you have failed, as

apparently we did in that case, to provide proper notice or something else, it is not able to be raised again.

These are things I think we have wrestle with to make sure the process is fair to the proponents, fair to those who want to intervene, but is final, because the consequences of going on with 12-year hearings or whatever they may be–in that case it was 14, I think, because of doubling back and going forward again–the consequences for society are just too great now.

Mr. McConnell: Mr. McGuigan, to minimize the risk of what you are talking about involves the question of whether or not the legislative requirements are clear and crisp; that minimizes the risk of a judge overturning it, and it minimizes the risk that is associated with the government staff who are applying that legislation, doing it incorrectly. I think it is within the control of the Legislature and the government to review that process and minimize that chance of those things happening frequently. I am not so naïve as to suggest that you will totally eliminate that risk, but I think the area you are raising is another area that does need very careful review.

Mr. McGuigan: I wonder whether you would put your lawyers to looking at that and perhaps advising the Legislature what they think should be done.

Mr. Franklin: We have been looking recently at what kind of approval process we could recommend, and we will be prepared to offer our recommendations to the ministry if and when it calls for them.

Mr. McGuigan: I would hate to see you go through that process and be counting on it and run into the problems you ran into before.

Mr. Franklin: My own view–and that is why I think we should get on with making some of these basic decisions–is that we cannot count on it; therefore, we should not count on it. If it comes, okay, we still do not have to put the shovel in the ground; we can wait. But I do not think we should rely on that because society being what it is, it may take a little longer than anyone in this room would like to take to shorten that procedure.

Mr. McConnell: In terms of this notion of having a portfolio, what Mr. Franklin was calling a banked approval, I think one should clarify going through the environmental assessment process and establishing that you have a project that is acceptable to the communities you are impacting on from an environmental point of view; but that does not that imply you would be short-circuiting the demonstration; you would have to show need at the time you were making the commitment.

I think this was not intended to be a blank cheque. I think we should differentiate that aspect of it. It is very similar to community planning. You do your thinking in advance and think about where you are going to put your roads and libraries and so on, but then there comes a time in which you then decide, do I build that school or not or do I build that hospital or not? when the need has risen. We are talking about perhaps separating the notion of environmental review to satisfy society from the question of need.

Mr. Chairman: Thank you. Mrs. Sullivan, have you finished your line of questioning?

Mrs. Sullivan: That is it.

Mr. Pollock: If I understood your comments correctly, you were saying you are coming up with a five-year prediction next year of what is going to be needed for Ontario Hydro. If that is the case, would there be another new nuclear power plant in that five-year prediction or is that jumping the gun a bit?

Mr. Franklin: No, we do not have any new generating stations of any kind in our forecast at the moment.

Mr. Pollock: None at all?

Mr. Franklin: We have the Darlington ones that are under construction and that is all. We have no other plans on the shelf.

Mr. Pollock: I see.

Mr. Franklin: Or on the drawing board. That is what bothers me just a little bit, that not having chosen the technology, we are not getting on with the plan.

Mr. Runciman: I have just a couple of quick questions. The minister, in a recent interview with one of the Toronto papers, mentioned that one of the things he would like to see happen is increased use of Ontario Hydro as an economic development tool. I know Mr. McConnell has expressed concern about that and I am wondering if you see any dangers in that, or if you have had any discussions with the minister in respect to how Hydro could be utilized to achieve the goals he apparently has in mind.

Mr. Franklin: I think Ontario Hydro has always played a role and should continue to play a role in economic development for the province. They have done it primarily through providing cheap, reliable and safe electricity as a core. They have also, where it has made good business

sense, done strategic procurement, for instance, which is one of the things the minister talked about. or the transfer of technology which it develops on its own and makes available to Ontario businesses. I think that should continue.

I have not had a discussion with the minister on his interpretation of exactly what he meant by that. My own personal view is that no public company should be in a position where it is in itself subsidizing or cross-subsidizing a community, an industry or segment of industry.

There is a definite role for government and a definite role for a public corporation. Sure, Ontario Hydro could be used as an instrument, I see no problem with that. When I worked in the telecommunications business, Bell Canada was used as an instrument to provide communications in northern Canada. But it did not take on the government's role; the government paid for that. I believe that is the proper separation between a public corporation and a government. Where it makes good business sense, Ontario Hydro should be doing it. That includes some of the things the minister had in mind, as I say, strategic procurement and spinoff technologies; that is good business sense. Where it strays from good business sense, it may very well still need to be done for public policy purposes, but I did not get elected by anybody and nobody at Ontario Hydro got elected by anybody and, therefore, I do not think we should be trying to assume the role of government.

Mr. Runciman: I am glad to hear that.

Mr. Franklin: Actually, the Power Corporation Act would not permit it as it stands now. Unless those changes were to be embedded in there, we would have to resist that in any case.

1710

Mr. McConnell: It was not I who mentioned that this morning. I think that was Mr. Palmer, and he mentioned that we did not feel we should be the agent to transfer money from the rich to the poor.

Mr. Runciman: I was not thinking of today. This was some time ago that you commented on it.

The minister has also been reported in the press recently on the fear of brownouts in the future, which I guess is based on your projections and is quite a valid concern, but he has tied that into the proposed free trade agreement, that it may have some impact in terms of brownouts. I wonder if you have a view on that.

Mr. Franklin: I think perhaps the free trade agreement, as he perceives it, could inhibit or take away some of the solutions to the problem we are facing post-1996. I think what he is envisaging is a greater competition for the power being generated by two of our sister provinces, Manitoba and Quebec. To the extent that the free trade agreement would make access to that easier, cheaper or more likely for the United States, then there is that much less for us. To the extent that the Americans are prepared to pay a higher rate for power than we would here, it takes away one of the arrows we have in our quiver for meeting this post-1996. I think it was in those terms, as I read the article, that the minister was talking, that it presented a more attractive customer to Hydro-Québec and Manitoba than Ontario Hydro could be and, therefore, diminished some of the possible solutions to our own problems there.

Mr. Runciman: So it is not, in effect, draining your resources; it is the availability of outside resources that he is referring to.

Mr. Franklin: Yes. I do not see how the free trade agreement would drain our resources. I guess I could perceive another concern about the free trade agreement, and that is that under certain conditions where you have to downsize the exports, because of a loss in generation, then you have to take proportionate downshare. If we had an agreement with Hydro-Québec and we were purchasing 2,000 megawatts and the United States was purchasing 10,000 megawatts and the generation went down in Hydro-Québec, then it would have to downsize some of the Americans', some of its own and presumably some of Ontario Hydro's and, therefore, we would have less reliance. It would not be a firm contract in that definition. That is not something we are faced with now, this proportionate downsizing.

Mr. Runciman: I have one final, quick question. In Atikokan the other day, the Premier (Mr. Peterson) was talking about the development of a national grid. How feasible is that?

Mr. Franklin: Well, we sort of have an international grid now, as I understand it, a North American grid at the moment. That is even bigger and better, I guess, than a national grid. It is true we do not have a national grid as opposed to an international grid. It is true that Hydro-Québec, for instance, is not attached to the North American grid, because of reliability problems. It is true there is no direct link between, say, Labrador's generating capacity and Ontario or out west, but I think it is also true to say that we have, and Ontario Hydro is part of the North American grid.

Mr. Runciman: I appreciate that. I am just saying that he was talking about a one-Canada policy, sort of a Canada-first policy, I guess, and having the development of a national grid. I am wondering if that is something feasible.

Mr. Franklin: I guess it is feasible. One could do that. There are interconnections now, but they are kind of isolated interconnections. If we are buying power from Hydro-Québec, we isolate the generating station that is producing that power and connect it to our grid.

Mr. Runciman: I suppose anything is feasible if you want to spend the money on it, but is it realistic?

Mr. Franklin: I really do not know. Mr. McConnell, you might have a view on that.

Mr. McConnell: Basically, in North America there are four grids. The first, a giant one that we are a part of, has 400 gigawatts in it, of which we are something like 30. The second one is Texas, because it refuses to interact with the rest of the United States, because it does not want to become dependent on the federal government. The third one is Hydro-Québec, for economy reasons. In keeping power costs down in Quebec, they have traded that off and accepted a less reliable system, and nobody is willing to interconnect with them. The fourth is the western interconnected system, which includes Alberta, British Columbia, Oregon and all the way down through California and so on.

There are four giant systems now, and all interconnections are installed as soon as they are economic. The idea of a national grid is not fa removed from a myth. Interconnections tak place as soon as it is economic to do so.

Mr. Runciman: It is not far removed from myth. Thank you very much.

Mr. Chairman: Mr. Franklin, I would like t thank you for coming in today and also, throug you, I would like to thank Mr. McConnell and hi panel and all those who worked with Mr McConnell to prepare the presentations whic we have had. I think the committee has sai before it is impressed by Hydro's ability t produce documents and briefs. We thank yo very much for that assistance.

Perhaps as a final question, Mr. McConnell can we take it that page 39B is an official part o this presentation?

Mr. McConnell: You can take it. I am sorry, had an old copy.

Mr. Chairman: Very good. I just wanted t get that clear.

Mr. Franklin: We just made that correctio last night.

Mr. Chairman: For the benefit of th committee members, tomorrow morning we ar going to have an in camera session to discuss al we have heard in the past weeks. I would ask th members to make sure they have their copy o Mr. McConnell's presentation with them at tha time.

The committee adjourned at 5:17 p.m.

CONTENTS

Wednesday, October 5, 1988

SELECT COMMITTEE ON ENERGY

Chairman: Carrothers, Douglas A. (Oakville South L)
Vice-Chairman: McGuigan, James F. (Essex-Kent L)
Brown, Michael A. (Algoma-Manitoulin L)
Charlton, Brian A. (Hamilton Mountain NDP)
Cureatz, Sam L. (Durham East PC)
Grier, Ruth A. (Etobicoke-Lakeshore NDP)
Matrundola, Gino (Willowdale L)
Ray, Michael C. (Windsor-Walkerville L)
Runciman, Robert W. (Leeds-Grenville PC)
South, Larry (Frontenac-Addington L)
Sullivan, Barbara (Halton Centre L)

Substitutions:
Lupusella, Tony (Dovercourt L) for Mr. Matrundola
Pollock, Jim (Hastings-Peterborough PC) for Mr. Cureatz

Clerk: Manikel, Tannis

Staff:
Argue, David, Consultant; with Passmore Associates International
Passmore, Jeff, Consultant; President, Passmore Associates International
Richmond, J. M., Research Officer, Legislative Research Service
Yeager, Lewis, Research Officer, Legislative Research Service

Witnesses:

From Ontario Hydro:
McConnell, Lorne G., Vice-President, Corporate Planning Branch
Palmer, Hedley, Director, Marketing Services and Development
Snelson, Ken, Manager, Demand/Supply Integration
Rothman, Mitchell, Chief Economist
Penn, Bill, Program Manager, Planning and Engineering Management Group
Marriage, Art, Director, System Planning
Franklin, Robert, President and Chairman